Global Labour Hours in Paid and Unpaid Work: Inequality, Productivity and Structural Transformation, 1800-2100*

Marie-Renée Andreescu, Romaine Loubes, Anne-Sophie Robilliard, Thomas Piketty

Abstract. This paper constructs global harmonized historical series on labour hours by gender, employment status in 57 core territories – 48 main countries and 9 residual regions – covering all world regions across the 1800-2025 period. We quantify the global decline in labour hours and relate it to the long run rise in productivity, with sizable variations across regions and periods . At the global level, hourly productivity (net domestic product per work hour) rose from about 0.7€ in 1800 to 16€ in 2025 (PPP 2025 €). In 2025, hourly productivity ranges from 4€ across Subsaharan Africa to 55-60€ in the USA, Sweden, Germany or France. In the long-run, about 35-40% of the rise in productivity was used to reduce labour hours and obtain extra leisure and 60-65% to raise production. We also stress the role of power relations and unpaid labour in the changing structure of labour hours throughout the 1800-2025 period. In particular, we find that the gender gap in hourly pay is currently much larger than usually thought once we include unpaid domestic work. Using this definition, the gender pay gap reaches 40-50% in rich countries, as opposed to 10-20% in conventional estimates. Finally, based on historical trends, we discuss future trajectories for labour hours, productivity, gender inequality and structural transformation over the 2025-2100 period. In our central scenario, we estimate that global hourly productivity could reach about 100€ in all countries by 2100, together with substantial reduction in work hours and gender gaps and large sectoral reallocation of labour time away from the most polluting sectors.

Keywords: Labour Hours, Productivity, Gender gap, Domestic work, Unpaid work, Historical evolution, Data harmonization

*All series constructed in this research are available online in the World Inequality Database (wid.world), together with a detailed replication package including raw data sources, methods and codes. We acknowledge financial support from the French National Agency for Research (ANR-17-EUR-0001) and a European Union Horizon 2020 grant (WISE Horizons #101095219). We thank the referees and editor for feedback that substantially improved the paper, and Emmanuel Saez, Amory Gethin and participants at the WIL internal seminar for their insightful comments.

1. Introduction

The industrial revolution created the concept of "labour hours", as manufacturing workers' productivity started to be measured in terms of time spent at work, instead of tasks achieved or objects designed (Nyland, 1990; Thompson, 1967). Since then, the productive use of time has become a topic of political and public debate, in which a large number of actors such as unions, health professionals, and researchers take part. Reducing the time spent at work to an amount considered as allowing for a decent work life balance became one of the main workers demands (Whaples, 1990, 1991) and Marx considered the Ten Hours Bill of 1841 as the first victory of socialism and its transformative power (Polanyi, 1944). On the other hand, the question of labour hours raised the issue of productivity: how can a nation be competitive in the international race for growth while limiting the amount of hours worked by its population to comply with social demand? Economic literature discovered that productivity is not a linear function of time worked (Pencavel, 2015): differences in productivity can be explained by a number of factors, the most important of them being human capital and technological advancement. Working too much can also be detrimental to health and future productivity (Kivimäki, 2015; Cha, 2010;). Understanding the optimal working hours that would maximize welfare and productivity is both a social and an economic issue (Cette, Drapala & Lopez, 2023).

However, providing an accurate estimation of the evolution of hourly productivity across countries and time has encountered important measurement issues, as historical records are rare and concentrated in a small geographical area. Researchers interested in analyzing the evolution of productivity are faced with the added issue of finding a consistent definition of the labor force as some groups, such as women or children were either excluded or included, as norms evolved (Broadberry, 2015; Humphries, 2010). Both the historical and economic literature (see e.g. Ashton, 1997; Thompson 1967; Maddison, 2001; Goldin, 1990) have worked to construct values of hours worked in different contexts and with varying definitions of effective time worked and the employed population. In this paper, we propose for the first time a synthesis of what hours worked look like through history, using a unified definition of these three concepts. We succeed in constructing global harmonized historical series on labour hours covering all world regions across the 1800-2025 period. Furthermore, we are able to differentiate this measure by gender and employment status in 57 core territories, composed from 48 main countries and 9 residual regions, the latter providing estimations for world regions, under the reasonable assumption of the unity of norms in a given geographical context.

This database allows us to quantify the undeniable global decline in labour hours over the past two centuries. The creation of this dataset relies on several historical sources, as well as assumptions that are detailed in the methodological section. There are several issues related to the global long-run history of labour time that this paper cannot address and the estimates provided are certainly more reliable for the 1960-2025 period than the previous century. Despite these limitations, the conclusions on working time are robust and provide a strong basis for further analysis.

Indeed, we use this harmonized measure of labour hours to compute the hourly productivity through time. We define productivity as the net domestic product per working hour – the data on the domestic product is taken from UN international sources, that are generally used by economic literature. We find that productivity has risen, although at a different pace in different world regions, a phenomenon that accounts for the persistent differences in development. While the average global productivity has increased from 0.7€ in 1800 to 16€ in 2025 (PPP 2025 €), this figure hides very strong disparities. In 2025 for instance, hourly productivity ranges from 4€ in Subsaharan Africa to 55-60€ in the USA and the Western European countries. While hours disparities were not very large across world regions in the beginning of the 19th century, we find that the differential productivity has acted as an exacerbating factor of inequality. We try to understand the -hours-productivity elasticity and find that in the long-run, countries with higher hourly productivity prefer to maintain their advance and work longer hours in order to increase national product. Only about 35-40% of the rise in productivity was converted in extra leisure time. The reduction in labour hours through history seems mostly correlated with political considerations and social advancements.

While the creation of a harmonized dataset allows for in-depth analysis of global trends in productivity, it also suffers from important limitations due to the uneven availability of historical sources. Furthermore, the historical sources we use lack the statistical detail needed to create confidence intervals for our estimates. We rely therefore on point estimates that are unlikely to reflect the entire reality, but allow an understanding of the order of magnitudes and the main trends that global labour hour have encountered trough history.

The computation of harmonized hours and productivity measures allows us to provide new estimations of inequality, especially regarding differences between genders. We leverage time-use survey from the 1970s and look at the difference between traditional economic work and unpaid domestic work. We find that when we take into account this unpaid work, women work systematically more than men and the gender pay gap is aggravated by the existence of this unremunerated labour. Using these figures, we try to account for what a “more equal” market could look like in the future: we run different scenarios of the trajectories that labour

hours and productivity could take until the next century. We find that remaining in the current tendency would only aggravate inequalities and would lead to an unsustainable future. However, a convergence of global hourly productivity could introduce a substantial reduction in work hours and gender gaps, as well as large sectoral reallocation of labour time away from the most polluting sectors.

This work is closely related to a large literature on the evolution and determinants of labour hours. In particular, a number of recent papers have attempted to explore the distribution of labour hours at the global level and its determinants (see e.g. Bick et al (2018, 2022), Fuchs-Schundeln (2024), Gottlieb et al (2024), Gethin and Saez (2025)). Recent work has emphasized the importance of heterogeneity in the evolution of labour hours across countries and income levels. In particular, Gethin and Saez (2025) document substantial cross-country and within-country heterogeneity in the relationship between income growth and hours worked, showing that declines in labour hours are neither uniform across income groups nor mechanically driven by productivity alone. One key difference is that many of these works usually focus on recent decades (i.e. they typically focus on the post-1980 or even post-2000 period), while we attempt to take a long-run, two-century-long perspective. There does exist a vast literature on the historical evolution of labour hours going back to the early 19th century, but with a more limited geographical scope. In particular, most of the existing historical research focuses upon European countries and Western offshoots (see e.g. Huberman (2004) and Huberman and Minns (2007) for an analysis of the main historical series covering Western countries beginning in the 19th century). Some estimates of labour hours going back to the mid-18th century for England and a number of other European countries have already been provided by previous economic and historic literature (see in particular Voth (1998, 2001), Reid (1976), De Vries (2008) and Allen and Weisdorf (2011)). Our work is also closely related to the US time-series literature on work, home production, and leisure, most notably Aguiar and Hurst (2007) and Ramey and Francis (2009). These papers provide highly detailed evidence for the United States over the twentieth century, based on harmonized time-use data, and have been instrumental in shaping our understanding of how productivity gains are allocated between market work, home production, and leisure. Our contribution differs in scope and perspective: rather than focusing on a single country with rich micro data, we provide a global, long-run analysis covering all world regions over the 1800–2025 period. One exception to this national focus is the work by Gilmore (2021), which puts together a large number of historical estimates on labour hours covering a large number of countries in all world regions (including in the global South) over the past two centuries. Interestingly, Bridgman, Duernecker, and Herrendorf (2018) provide cross-country evidence on household production and gender differences using harmonized time-use surveys. They are able to construct a comparison between 43 developed and developing countries over the 1960–2014 period, showing that household hours account for a

substantial share of total work. We build on these findings and extend their results using new surveys, while also providing a long-run global analysis covering the 1800–2025 period.

Another related strand of research focuses on structural transformation and productivity dynamics across sectors and regions, including in the global South such as in McMillan (2014), to which we add a historical perspective. Our analysis is also related to the extensive literature on structural transformation which studies the long-run reallocation of labour across sectors with different productivity levels (see e.g. Rogerson, 2008; Restuccia, Yang and Zhu, 2008; Herrendorf, Rogerson and Valentinyi, 2014). While this literature primarily focuses on shifts across market sectors, it provides a useful framework for thinking about the boundary between market and non-market production. Recent contributions explicitly extend this perspective to household production and gendered labour supply, notably Ngai and Petrongolo (2017) and Moro (2015, 2017), who emphasize how structural change interacts with home production, services, and female labour supply. We build heavily on these bodies of historical research, with two main differences and innovations. First, we put together a more complete and systematic historical database, including long-run series on labour hours by gender and employment status covering 57 countries and subregions across the 1800-2025 period. Next, and most importantly, we analyse the long-run global decline in labour hours in relation to the long-run rise in productivity, and we build upon our historical findings in order to offer a prospective analysis of possible future trajectories over the 2025-2100 period.

Our long-run global perspective allows us to obtain new insights about the determinants of labour hours. Generally speaking, the existing literature rightly stresses the existence of a negative elasticity of labour hours with respect to productivity. That is, labour hours tend to decline when countries become more productive, thereby opening the way for a high-productivity, high-leisure future, as famously analysed by Keynes (1930) in his writing on *Economic possibilities for our grand-children*, where he predicted that productivity advances would lead to the 15-hour workweek in the long-run. On the basis of standard utility-maximizing economic logic, the usual interpretation for this historical pattern is that income effects dominate substitution effects, i.e. higher income leads to higher consumption of leisure, even though the relative price of leisure also rises. However, the literature has shown that this logic is somewhat too deterministic and simplistic. In practice, there are important variations in labour hours (for a given level of income and productivity) which this standard neoclassical theoretical framework cannot properly explain, in particular regarding the different speed of labour hours reduction over time and across regions, as well as the complex and multifaceted transformations in the gender structure of labour hours (see e.g. Bick et al (2018, 2022), Fuchs-Schundeln (2024), Goldin (1995, 2024), and Gottlieb et al (2024)). In short, institutions and power relations matter a great deal for the determination of labour hours. A closely related contribution is Boppart and Krusell (2020), who study the long-run decline in hours worked

and argue that it can be rationalized within a balanced-growth framework in which income effects of rising productivity slightly dominate substitution effects. Using long historical time series for advanced economies, they show that a stable preference structure can generate a gradual decline in hours as part of a balanced-growth path. Our contribution is complementary in several dimensions. First, rather than focusing on preference-based explanations, we document the long-run joint evolution of labour hours and productivity at the global level, across all world regions over the 1800–2025 period, in a much larger set of countries. Second, we explicitly incorporate gender differences and unpaid domestic labour, which are largely outside the scope of their framework. Finally, our analysis emphasizes the role of institutions, power relations, and social norms in shaping labour hours, alongside income effects.

Our historical results seem consistent with this general conclusion and bring additional long-run perspectives into the discussion. More specifically, we provide three main sets of stylized facts. First, we estimate a sizable global decline in labour hours over the 1800-2025 period. Annual labour hours per worker drop from about 3200 hours to around 2100 hours (-34%), while annual hours per working-age individual (15-to-64-year-old) drop from 2100 hours to 1300 hours (-38%). At the same time, we observe large variations across periods and regions in the speed of work time reduction, including for a given level of income. The main period of work time reduction happens between 1860 and 1980. This coincides with the rise of the labour movement and the development of powerful new organizations (trade unions and working-class political parties of various stripes). These are likely to have played a critical role in shaping class relations and state legislation that built the welfare state and reduced work time. We also observe changing trends in the gender patterns of work, including a long-run U-shaped pattern of women employment ratios in some regions and a very slow rise of men domestic labour. We compare the long-run magnitude of unpaid women work to other forms of unpaid labour (including forced labour) over the 1800-2025 period. The results indicate that the long-run history of labour time is a complex socio-political history involving collective mobilizations, power relations, changing institutions and social norms, and not simply an economic history involving income and substitution effects.

Next, we relate the decline in labour hours to the global rise in labour productivity over the 1800-2025 period. In particular, we use our global historical series to estimate the elasticity between labour hours and productivity. In our baseline specification, we find an elasticity of about -0.15 i.e. when productivity rises by 1%, labour hours decline by 0.15%. This is quite substantial. This means that if productivity is multiplied by 24 (consistent with the estimations of the rise in productivity at the global level between 1800 and 2025), then labour hours should decline by about 35-40%.[1] To put it differently, about 35-40% of the 24-fold rise in productivity

[1] $24^{-0.15}=0{,}62$.

seems to have been used to reduce labour hours and obtain extra leisure (rather than extra production), and 60-65% was used to raise production. We stress that this global elasticity cannot be interpreted in a mechanical manner. In practice, work time reduction might partly reflect some fundamental preference for leisure (especially when labour time is very high and/or when purchasing power is very large), but requires major collective mobilizations and institutional transformations in order to materialize. In other words, this elasticity should be viewed as a "political" elasticity rather than a pure economic elasticity. "Political" elasticity here denotes the empirical elasticity of labour hours with respect to productivity that reflects institutional arrangements, bargaining power, and collective decision-making over working time, rather than individual labour–leisure choices in a frictionless market.

Finally, on the basis of historical trends, we discuss several possible trajectories for labour hours, productivity, gender inequality and structural transformation over the 2025-2100 period. The purpose of this exercise is illustrative rather than predictive: the scenarios are designed to highlight how different assumptions about productivity growth, labour allocation, and gender equality interact, given the long-run patterns documented in this paper. To do so, we focus on two polar benchmark scenarios: a *Business-As-Usual* (BAU) scenario and a *Global-Convergence* scenario. In the BAU scenario, country-specific trends observed over the 1990–2025 period continue mechanically over 2025–2100, including productivity growth rates, labour hours, gender gaps, and sectoral structures. This scenario therefore does not incorporate additional policy coordination, structural breaks, or accelerated convergence mechanisms, and serves as a continuation of recent trajectories. Under these assumptions, North–South inequalities widen. In particular, hourly productivity rises to 9€ (PPP 2025 €) only in Subsaharan Africa by 2100 (vs 4€ in 2025). At the same time, population in Subsaharan Africa is expected to rise to about 3.3 billion by 2100 (vs 1.3 billion in 2025) according to UN population prospects. Taken together, these dynamics illustrate a potentially unstable socioeconomic path, characterized by strong demographic pressures, rising distributional and geopolitical tensions, and major obstacles to global cooperation on climate and other collective challenges.

In contrast, the "Global-Convergence" scenario is defined as a counterfactual benchmark in which long-run inequalities in productivity and gendered labour allocation are gradually reduced through accelerated catch-up. We assume convergence of hourly productivity levels across countries to around 100€ (PPP 2025 €) by 2100, supported by sustained investment in human capital and infrastructure in the global South—particularly in Sub-Saharan Africa and South and South-East Asia. We also assume full gender equality by the end of the century, understood as convergence between women's and men's employment ratios, economic labour hours, and domestic labour hours. This scenario should not be read as a forecast, but as a benchmark illustrating the implications of rapid convergence under favourable institutional and

policy conditions. A key question for future research is whether such a trajectory—combining high productivity levels worldwide with reduced working time and gender equality—is compatible with ecological constraints, especially as climate damages increasingly affect productivity in the most exposed regions. We argue that such a path is theoretically viable only if it is accompanied by substantial structural transformation, including a large reallocation of labour away from the most polluting sectors and a significant reduction in average working hours. While this scenario involves major economic, political, and institutional challenges, it highlights a set of trade-offs that appear less severe than those implied by the continuation of current trends under the Business-As-Usual scenario.

The rest of this paper is organized as follows. We briefly discuss our concepts and methods in section 2. All technical details about data construction (from raw sources to final data series) are available in the online data appendix. In section 3, we present our main findings on the global reduction of labour hours over the 1800-2025 period and the long-run transformations in the gender patterns of work and the global share of unpaid work. In section 4, we relate the global decline in labour hours and the global rise in productivity and estimate the elasticity of labour hours with respect to productivity. In section 5, we analyse different possible scenarios for the global evolution of labour hours and productivity over the 2025-2100 period. Finally, we offer concluding comments and discuss future research prospects in section 6.

2. Concepts and Methods

2.1. Concepts of Labour Time: Economic vs Domestic

Our long-run analysis of labour time and productivity will focus for the most part upon "economic labour", which we define as labour time that is used as an input to produce the various goods and services that are included in existing national accounts (see Table 1). In practice, this includes all goods and services which are produced for sale on a market by households, corporations and other organizations, goods and services provided for free by government and non-profit organizations, as well as goods (*not* services) that are produced by households for their own final use.[2]

Economic labour is thus a relatively broad concept that includes many forms of work: market and non-market, formal and informal, paid and unpaid labour. As an example of non-market labour, one can think of the labour time supplied by public-sector teachers, nurses or doctors. In national accounts, their output is valued at production costs, i.e. it is equal to the monetary

value of the public sector wages and intermediate consumption used to provide these services. In that sense, it follows a process of political valuation (determined by various forms of public deliberation and collective decision-making procedures) rather than "pure" market valuation. As an example of informal unpaid labour, one can think of unpaid family workers in particular in the agricultural sector but possibly in other sectors as well. In contrast with non-economic labour, the output of unpaid family work is accounted for in national accounts, generally on the basis of the estimated market value of the goods and services produced. In many countries, this can represent a significant share of gross domestic product. As we go back in time, economic labour also includes other forms of unpaid work, including slave labour and various types of forced labour used in plantation economies and other contexts.

Though it is a relatively broad concept, economic labour does exclude "domestic labour", which we define as labour time that is used to produce services that are not included in existing national accounts. In the International Classification of Activities for Time-Use Statistics (ICATUS) 2016 classification, these activities include 'Unpaid caregiving services (…) (4)" and "Unpaid domestic services for household and family members (3)". Domestic labour includes different forms of labour, and in particular housekeeping tasks (cleaning, cooking, child-caring, old-age care, etc.). This excludes self-care, education and leisure time. One way to measure domestic labour is provided by "time-use surveys", which are based on time diaries filled by a representative sample of respondents over a period of several days and will usually follow the ICATUS classification. When we put together the time-use surveys conducted in various parts of the world, and thus account for domestic labour, one general finding is that women always tend to work longer hours than men. Also, in all categories of countries, women provide fewer hours of economic labour but a lot more hours of domestic labour, so that their total labour time is always significantly larger than that of men, particularly in low-income and middle-income countries (see Figure 1).

In spite of the fact that women work more than men, they earn a lot less, in all parts of the world (see Figure 2).[3] This reflects the fact that women supply a very large share of domestic labour (which is entirely unpaid), and that when they supply economic labour they also get paid less than men.

Ideally, it would be very interesting to fully include domestic labour into our historical analysis and to study the global distribution of total labour time (economic and domestic) over the 1800-2025 period and across world regions. In the same spirit, one might want to re-define and re-

[3] The estimates on women's shares in total labour income (wage income + 70% of self-employment income) reported on Figure 2 come from WID series (See Neef and Robilliard (2021).

estimate GDP entirely on the basis of total labour time. In order to do this, we would need to value the output of domestic labour. One standard way to do this consists of using existing market prices for similar goods and services (as seen in the references provides by De Vries (2008, p.30). One could also use various forms of political valuation, in the same way as for the case of public sector output. In this research, we will however not attempt to develop such computations. The main reason is that we have very limited information on the long-run evolution of domestic labour over time, so that such computations would mostly rely on assumptions and would have limited interest. In this case, rather than trying to attribute a monetary value to these concepts, we will develop new forms of "material accounting" (including labour time accounting, carbon accounting, natural resources accounting, etc.) in order to address the issue of domestic labour.

Generally speaking, time-use surveys are a very useful source to develop such a material accounting approach. Unfortunately, these surveys are unavailable for most countries, and, when available, they usually cover a small number of years, making it difficult to build country-level series on domestic labour time, even for the post-1970 or post-1980 period. Most importantly, there exists no time-use survey before 1960, so that, by construction, it is wholly impossible to use such sources and methods to study the long-run evolution of domestic labour time before 1960 rigorously.[4] In contrast, despite their many imperfections, there are relatively well-developed data sources on economic labour hours for many countries and in most parts of the world since the 19th century, allowing for meaningful long-run analysis. This is why our main historical series covering the 1800-2025 period will focus upon economic labour and exclude domestic labour. In particular, our analysis of labour productivity will concentrate on economic labour and conventional GDP (as currently defined). We will however address the question of domestic labour when we analyse recent decades (1960-2025) and when we discuss future trajectories for work hours and gender gaps over the 2025-2100 period. We will see for instance that the pattern described on Figure 1 prevails in all world regions and that it has changed relatively little since the 1960s in Europe and the United States (see Section 3.2). We will also provide some approximate assessment of the share of unpaid labour (including domestic labour) in global labour time over the 1800-2025 period (see Section 3.3) and analyse the implications of unpaid labour for the measurement of the gender gap in labour pay (see Section 3.4).

2.2. Geographical Coverage and Data Sources

[4] There exists one time-use survey that was conducted in the US in 1965, but in most European countries the first large-scale time-use surveys were not conducted before the 1970s or 1980s. In many countries time-use surveys do not exist before 1990 or even 2000.

Our main objective is to construct homogenous series on labour hours covering 57 core territories in the world over the 1800-2025 period (see Table 2).[5] Namely, we seek to construct estimates at the decade-country-gender level of hours worked per week in economic and non-economic labour. For the productivity-related sections, we also need annual estimates of hours worked per week and employment-to-working-population ratios. While a more thorough discussion on how each variable is built is available in the Online Appendix, we detail here our approach in terms of sources and priority rules and discuss its main caveats. A methodological document and a summary document in the Appendix go into deeper details in the age concept, the priority rules and other issues.

For economic labour hours per worked week among the employed working-age population, we use two different approaches before and after 1980. In recent years, we combine data on actual hours worked per week from the ILO and on average working hours from the JOIN database – with priority going to the former, although the two databases yield very similar estimates (and similar to our own estimates obtained from direct micro-surveys processing) for the same country-years. We obtain economic labour hours per week and their decomposition by gender and employment status. This is the best way to ensure that the resulting series are as homogeneous as possible and rely on similar methods. When this is not possible, we also use existing harmonized labour hour data, in particular the ILO database and the JOIN database compiled by the World Bank.6 Historical estimates covering the nineteenth century and the early twentieth century typically rely on aggregated sources rather than micro-level data. For this period, employment and labour input measures are generally not available in the form of harmonized micro-files, and must instead be reconstructed from statistical yearbooks, population censuses, and other official national publications in which these figures were originally reported. In addition, we rely on existing global historical series on labour hours compiled by Huberman (2004), Huberman and Minns (2007), and Gilmore (2021), which provide consistent benchmarks for long-run trends.

For employment ratios, we compile data directly from national statistical publications whenever available. Because definitions of the working-age population and employment status vary across sources and over time, we implement a harmonization procedure to ensure comparability. When several series exist for the same country using different age cut-offs or

[5] The list of 57 core territories described on Table 2 (including 48 countries and 9 residual regions) is an extended version of the set of 33 core territories (including 24 countries and 9 residual regions) introduced by Chancel and Piketty (2021) in order to study the long run evolution of the global income distribution.

[6] The ILO and JOIN database on labour hours cover more countries outside developed countries than OECD or BLS databases, and appear to be more homogeneous than the Penn World Tables data series on labour hours, but which we do not use in the present work. For the subset of rich Western countries in recent decades, all databases basically deliver the same series.

employment definitions, we construct adjustment factors based on overlapping years or age-specific decompositions to map historical series onto a common working-age population definition. This procedure allows us to recover consistent employment-to-population ratios by gender over time, including the female employment shares. While this approach cannot fully eliminate measurement uncertainty, it ensures internal consistency across sources and periods and makes explicit the assumptions required to extend employment series back to the nineteenth century.

In effect, our long-run series combine micro data (employment & time-use surveys) over the 1960-2025 period with historical series 1800-1960 coming from industrial surveys. These surveys cover mostly the manufacturing sector, which potentially can introduce important biases. We thus check that work hours in manufacturing and non-manufacturing display consistent trends over time & across regions over the 1960-2025 period. Generally speaking, average weekly work hours tend to be longer in manufacturing than outside manufacturing, but the between-sector gap is relatively small (on average 2.7% across regions) as compared to the overall between-region gap (as much as 10-15 hours per week). For example, in Europe average weekly work hours for employed working-age men (15-to-64-year-old) in 2000-2025 are 36,5 hours in manufacturing and 36,2 hours in non-manufacturing, vs 48,5 hours in manufacturing and 43,9hours in non-manufacturing in South & South-East Asia (see Figure 3).[7] Changes in the sectors included in our estimates could also influence the observed decline in hours worked per worker if the decline is driven by shifts in the underlying databases rather than actual economic changes. However, the majority of the reduction in labour hours per worker occurs between 1860 and 1980, a period that predates our transition to the micro-data that systematically covers both sectors. Additionally, the consistency of this pattern is further supported by the fact that where data is available, we observe declines in hours worked across both non-manufacturing and manufacturing sectors in all regions from 1990 to 2025 (see Appendix for the raw sector-specific data and for country-decade level information on sources utilized). Finally, in robustness checks, we confirm that the estimates remain of the same magnitude and significance when only working on the 1980-2025 period where the data include all sectors (see Table 5).

We also collect non-economic labour hours worked per week at the decade-country-gender level, for all working age individuals regardless of whether they have a job. For this, we use in priority time use surveys. Some are harmonized under the Multinational Time Use Survey (MTUS) combined files, which we complement with variables extracted from non-harmonized time use surveys for several countries (See Appendix for a list). For countries with missing

[7] See Online Appendix for complete series.

decadal observations, we further complement with harmonized household surveys (EHCVM, in West Africa) and data from the SDGs[8]. For each of these sources, we stick closely to definitions from ICATUS outlined in our conceptual section and to account for differences in worked vs. non-worked days when the whole week is not surveyed in time use series, to arrive at harmonized weekly hours of our key labor concepts.

Several series are added in as we produce estimates and scenarios for productivity patterns. This entails going from our worked week economic labour hours estimates to annual hours per country. First, we construct estimates of the proportion of working-age-population individuals that are employed by gender, with ILO and JOIN data for later years and using annual trends global series on male and female labour participation from Dili et al (2021) for earlier years.

Regarding conversion factors from hour per weeks to annual hours before 1960, we follow the method and assumptions proposed by Gilmore (2021) regarding the gradual transition from a 6-day work week to the 5-day work week over the course of the 20th century and the slow rise of paid vacations over the 1800-1960 period. Generally speaking, there exists no fully standardized method to compute and compare annual hours at the international level (see.g.Ward et al (2018)). For more recent period (1960-2025), we use micro surveys in order to measure work days, vacation days and the number of weeks worked per year directly – combining data on annual hours of labour from OECD and TED and dividing them by weekly hours from the ILO to obtain country-decade estimates.

All of these series are then combined into decade-country(-gender) level observations, with missing points replaced by residual regional averages to obtain coherent and harmonized country series. The series before harmonization and filling of missing points as well as the codes for the procedure are available in the Appendix.

We should make clear at the outset that we face important limitations in terms of historical data sources. There are many key issues related to the global long-run history of labour time that cannot be properly addressed. Generally speaking, the 1960-2025 period – for which a large set of micro surveys is available – can be analysed in a much more systematic manner than the 1800-1960 period. We stress however that there are also several important issues on which robust conclusions can be drawn for the full 1800-2025 period. Such a global historical perspective can shed new light on on-going discussions about structural transformation, work hours and socioeconomic development in the 21st century.

[8] indicator on time spent on unpaid domestic and care work, disaggregated by age group and gender (UN SDG indicator 5.4.1)

3. The Changing Structure of Labour Hours since 1800: Long-Run Trends and Post-1960 Evidence

3.1. The Global Reduction of Annual Labour Hours, 1800-2025

We highlight four broad evolutions that characterize the changing structure of labour hours in the long run, to varying degrees of precision depending on the period and the type of data available. The first evolution is the global decline in annual economic labour hours. The second one is the transformation of the gender patterns of work, with some evidence of a long-run U-shaped evolution of women's employment-to-population ratios and the very slow and uneven rise of men's domestic labour. The third one is the long-run transformation in the role of unpaid work in global labour time, with a decline in forced labour and a rise in the relative importance of domestic labour. The last one is the persistence of an sizeable gender gap in labour pay, particularly when domestic labour is taken into account. While we provide long-run estimates of labour hours and employment back to 1800, precise and fully comparable data are not available for all dimensions of labour over the entire period. As a result, the long-run patterns documented below should be interpreted as broad trends and stylized facts rather than as precise year-by-year measurements, especially for the pre-1960 period.

We begin with the global decline in economic labour hours over the 1800-2025 period. The number of annual economic labour hours per capita can be broken down into three terms:

Annual economic labour hours per capita = Annual economic labour hours per worker
x Employment rate[9] among working-age population (15-to-64-year-old)
x Working-age population share of total population (1)

The third term is purely demographic: it measures the evolution of the share of the working-age population (defined as the population aged 15-to-64-year-old) in total population. In practice, this term shows relatively little long-term evolution and plays a limited role in our analysis: working-age population has consistently represented about 60-65% of total population at the global level over the 1800-2025 period. This reflects the fact that the decline in the share of young-age population (0-to-14-year-old) – from about 35% to 25% of total population at the global level between 1800 and 2025 – has been approximately compensated by the rise in the

[9] Following **historical usage in the labour economics literature,** we use the term "employment rate" to refer to the ratio of employed individuals to the working-age population. This corresponds to the terme "**employment-to-population ratio"** used in contemporary ILO statistical reporting

share of old-age population (65-year-old and over) – from 2% in 1800 to over 10% in 2025 at the global level. This evolution is projected to continue over the course of the 21st century.[10]

The first term, annual economic labour hours per worker, appears to be quantitively the most important one in the long-run. To be more precise, we are looking at average annual hours of economic labour among working-age individuals with positive hours of economic labour, irrespective of their gender or labour status. Our estimations suggest a large decline of annual labour hours per worker across world regions over the 1800-2025 period, from about 3200 hours to around 2100 hours (-34%) on average at the world level (see Figure 4). At the same time, we observe substantial heterogeneity across periods and regions in the speed of work time reduction. Note that annual labour hours around 3200 hours observed during the first half of the 19th century reflect very large worktime by modern standards: this corresponds to about 60-65 hours per week all year long. In contrast, annual hours around 2000 correspond to about 40 hours per week during 50 weeks (2 weeks in paid vacations), and annual hours around 1600 hours (such as those currently observed on average in Europe) correspond to about 35 hours per week during 47 weeks (5 weeks in paid vacations). In practice, multiple margins appear to have contributed to the historical reduction of labour hours, including shorter workdays, the transition from six-day to five-day workweeks, and the expansion of paid vacations.

The main period of work time reduction appears to occur between 1860 and 1980. This corresponds to the rise of the labour movement and the development of powerful new organizations (trade unions and working-class political parties), which are commonly viewed as having played a critical role in shaping legislation and collective bargaining to reduce work time (Whaples, 1990; Lindert, 2016). This may help explain why worktime reduction has been particularly strong since the 19th century in Europe, since Europe is the historical home of the labour movement, much more so than the US (a feature that has been attributed to several factors, including the existence of extreme racial divisions within the US working class- see e.g. Alesina et al. (2001)). Similarly, the rise of labour time in the early 19th century Europe is often interpreted as reflecting the lack of an organized labour movement in the early stages of the Industrial Revolution (Thompson, 1967; Pollard, 1963). We return to the discussion and interpretation of these various historical and regional patterns when we relate work time reduction to productivity growth (see section 4).

The second term – i.e. the employment rate– also displays important historical changes over the 1800-2025 period, although these changes partly seem to compensate each other in the long-run. For working-age men, the employment rate is estimated to have been relatively stable around 80-85% at the global level in the long-run, from 1800 until the 1960s-1970s, with a

[10] See Appendix Figures A1-A9 and Gomez Carrera et al (2024).

gradual decline from 80-85% to around 75% between the 1970s-1980s and the 2010s-2020s (see Figure 5). This decline can be plausibly be attributed to a variety of factors: late entry of younger generations into the labour market due to educational advances; early retirement of older generations; lack of attractive employment opportunities due to insufficient capital investment or mobility constraints, etc. In practice, though the exact combination varies across regions, the first factor – late entry of young generations - appears to be the most important (Acemoglu & Autor, 2011). The employment rate of the youngest working-age men (15-to-24-year-old) was almost as high as the average rate, up until the 1960s-1970s, when access to higher education was very limited in most world regions (less than 10% of a cohort). It is now averaging 50% of younger cohorts in most world regions.[11]

The long-run evolution of employment rates for women is more complex – and in many ways more interesting – than that observed for men. A commonly discussed pattern in the literature is a U-shaped evolution (see Figure 6 for absolute women employment rates, and Figure 7 for relative women employment rates). That is, women start with high employment rates in almost every region in the early 19th century in the context of largely agricultural societies; then employment rates tend to decline for women from the late 19th century until the middle of the 20th century with the rise of manufacturing employment and of the breadwinner model. Women's employment rates then reboundin the second half of the 20th century and in the early 21st century, together with the rise of the service sector and of stronger social norms advocating gender equality.

This general U-shaped pattern has been analyzed extensively in the research literature, particularly in the case of Western countries (see e.g. Goldin 1995, 2024), and echoes an earlier insight emphasized by Boserup (1965), who documented how structural transformation may initially displace women from economic work before later expansions in education and services foster their re-entry. However, several important points should be emphasized. First, existing research suggests that the declining part of the U-shaped pattern is more modest in size than the rising part (see Ngai et al. 2024). Second, there are large variations across countries and regions, and the observed longitudinal U-shaped pattern in some developed countries, as well as the cross-sectional U-shape at the world level, do not necessarily translate into longitudinal U-shaped evolutions in all world regions (see e.g. Mammen and Paxson 2000; Klasen 2019;

[11] In order to account for the large variations in employment ratios over time and across countries, Bick et al (2022) also stress the role of declining fixed costs of employment over time (which could be interpreted as the consequence of multiple factors: lower commuting time due to urban setting, less frequent work casualties, etc.). This could contribute to explain convex employment ratios but concave hours. They also stress the existence of very high employment ratios but low hours in traditional self-employment sectors, with declining relative productivity over time.

Dinkelman and Ngai 2022). Consistent with this heterogeneity, our global long-run estimates suggest that while a U-shaped pattern in women's employment rates can be observed in several regions, it is far from universal and exhibits substantial variation in magnitude and timing. In particular, the rebound in women's employment rates in the MENA region in recent decades appears very limited compared to other regions (see Figures 6–7), therefore there is not strong visual evidence of a generalized U-shape across the globe. Most importantly, we stress that comparisons of long-run trends in women's employment at the global level are subject to severe measurement limitations—an issue to which we return in Section 3.2—which call for caution in interpreting both cross-regional differences and aggregate U-shaped patterns. If we combine men and women, we find that total employment rates appear relatively stable around 60-65% of working-age population over the 1800-2025 period, usually with a moderate-size long-run U-shaped pattern (see Figure 8). In most regions, the decline in men employment rates observed since the 1970s-1980s has been more than compensated by the rise of women employment rates, so that total employment rates increased significantly. The only exception to this pattern is the MENA region, where total employment rates declined in recent decades.

If we now combine our findings on annual labour hours per employed individual with those on employment rates, we find that *annual hours per working-age individual* (15-to-64-year-old) have declined substantially at the global level over the past two centuries, from about 2100 hours to around 1300 hours (-38%) (see Figure 9). Given that total employment rates have shown little variations in the long run, the decline in annual labour hours per working-age individual has been approximately the same than that of annual labour hours per worker. We also observe approximately the same decline of annual labour hours per capita, in line with the fact that the fraction of working-age population in total population has also been relatively stable in the long run.[12] Despite important regional differences, it is striking to see that this massive decline in labour hours happened all over the world during the past two centuries.

3.2. The Changing Gender Patterns of Work: Uncovering the Invisible

As already noted, the history of labour hours over the past two centuries is characterized by several major transformations. The first transformation is the global decline in annual economic labour hours, which is relatively well measured. The second transformation is the multifaceted restructuring of the gender patterns of work, which is much less well documented, particularly before the second half of the twentieth century. In many ways, women labour has been made invisible, or at least has been more difficult to measure in an historical and comparative

[12] See Appendix Figures B1-B10. At the global level, annual labour hours per capita declined from about 1300 hours in 1800 to around 800 hours in 2025 (-38%).

perspective, reflecting the fact that female labour has received a lot less attention than male labour from public administrations, statistical surveys and societies as a whole.

When we refer to the changing gender patterns of work, we should make clear that we are referring to two different (though interrelated) evolutions: first, the long-run patterns often described as an U-shaped evolution of women's employment rates in terms of economic labour; next, the very slow and uneven rise of men's domestic labour associated with very slowly receding gender gaps in total labour hours.

Regarding the first evolution, the key point is that it is only in recent decades that we have started to see the development of labour force surveys allowing for a rigorous measurement of all forms of economic labour and work status, including not only wage labour and self-employment but also unpaid family work, which has played a major role in the history of women labour. By putting together employment surveys covering 35 countries in all world regions over the 2010-2025 period, we document several recent trends. First, unpaid family work is systematically more widespread among women, and particularly so in the developing world. In low-income countries, 38% of all employed women are wage-earners, 36% are self-employed and 26% are unpaid family workers. In contrast, 47% of all employed men are wage-earners, 43% of self-employed and 10% are unpaid family workers (see Figure 10). Unpaid family work is particularly common among women in MENA, Subsaharan Africa and South & South-East Asia (see Figure 11). The share of the population that is self-employed is always a lot larger for men than for women. We also have surveys using similar questionnaires and concepts since the 1970s in rich countries. Unpaid family work among women was relatively common at the time, especially in European countries with a large agricultural sector (see Figure 12). Instead, unpaid family work was already very low in North America in the 1970s-1980s, reflecting the small size of the agricultural sector (see Figure 13).

In some countries, and particularly in the US, the information available in censuses makes it possible to approximate the importance of unpaid family work for women in the agricultural sector and other economic sectors in the in the 19th century and early 20th century. It is by using such census data that Goldin and others were able to estimate the U-shaped pattern of employment rates for the US (see e.g. Goldin (1995, 2024)) and this is also what we did in order to estimate our global long-run series on women employment rates (see Figures 6-7). However, we stress that the methods and questionnaires used in historical censuses vary substantially over time and across countries and are not entirely comparable to modern labour force surveys. For example, many 19th- and early-20th-century censuses either did not record unpaid family work explicitly or classified women primarily by marital status or household role, leading to systematic underreporting of women's economic activity relative to modern definitions. The

general patterns and the broad orders of magnitude appear to be reasonably robust, but this clearly puts strong limitations on our ability to analyse long-run comparative cross-country trends. More extensive data collection using historical censuses might allow uncovering novel interesting patterns and new aspects of the largely invisible history of women labour.[13]

Measurement problems are even more acute when it comes to the study of total labour time, including both domestic and economic labour. Modern time-use surveys begin in the 1960s-1970s in rich countries, but global coverage extends very gradually and it is only in the 2000s-2010s that most world regions are covered in a more comparable manner. Before the 1960s-1970s, there exists no data source which would allow for rigorous comparisons with modern time-use surveys. While there is extensive historical evidence suggesting that women already supplied most domestic labour in the 19th century and early 20th century in all world regions, there seems to be little way to make precise quantitative comparisons. By putting together time-use surveys covering 35 countries in all world regions over the 2000-2025 period, we obtain two main findings. First, as already stressed in section 2, women work more than men in all categories of countries. All over the world, women supply fewer hours of economic labour than men, but they supply so many more hours of domestic labour time that their total labour hours are always higher than those of men (see Figure 1). Next, we find significant variations across world regions. In particular, the gap in total labour hours between men and women is very large in MENA, East Asia, Russia and Central Asia and South & South-East Asia (see Figure 14). This comes from the fact that women supply a lot more domestic labour than men in these regions, and that in addition they also supply substantial economic labour. Note that women supply very limited economic labour in Middle East/North Africa, but that they supply so much more domestic labour than the total gap is of similar magnitude. In contrast, women appear to supply less domestic labour in Sub-Saharan Africa.

By putting together the time-use surveys conducted in Europe and North America/Oceania since the 1960s-1970s, we also find that the gender gap in total labour hours has declined only modestly. This reflects the fact that the decline in women domestic labour has been slow and largely compensated by the gradual rise of women economic labour (see Figures 15-16). Note that the gender gap in total labour time appears to be particularly large in Europe in the 1960s-

[13] For instance, by re-exploiting historical US census data, Goldin (1977) shows that changing social norms and social valuation of women's work are critical in order to explain the much larger employment ratios observed among black women than among white women around 1890-1920 (including for a given level of education and household income). In effect, post-slavery black women appear to value salaried work, while white women associate women salaried work to black women (for servant-type jobs and other unskilled jobs held by black women).

1970s, roughly of the same magnitude as in South & South-East Asia or Middle East/North Africa today (see Table 3).[14] The gender gap in labour time did narrow in Europe between the 1960s-1970s and the 1980s-1990s, but since then it has changed very little. In North America/Oceania, the gender gap appears to have increased in recent decades, reflecting the fact that the decline in women domestic labour hours has been more than compensated by the rise of women economic labour hours.[15] Overall, a robust pattern in the available time-use data is that women supply a larger share of total labour hours than men. The variations around this basic fact are interesting but remain of limited magnitude. Women generally supply about 55% of total working time (see Table 3).

While we use a different set of time-use surveys and apply specific definitions, our general findings are broadly consistent with other studies (see e.g. Gottlieb et al, 2024). Gottlieb et al also show that in order to explain huge variations in domestic and economic labour hours across countries, it is not enough to look at gender gaps in relative wages and productivities. One needs to acknowledge the existence of large between-country variations in the non-monetary costs of women *economic* labour and of men *domestic* work. Or, to put it another way, social norms, institutions, ideology and power relations seem to matter at least as much as "pure" economic factors in order to account for variations in labour patterns over time and across countries (see e.g. Gottlieb et al (2024) for an attempt to relate gender gaps in labour hours, gender norms and religion) We should also stress that these differences between countries are not "frozen" over time. Large-scale political transformations can radically alter work patterns, as exemplified by unusually large economic labour hours supplied by women in ex-communist countries. We see much less impact on domestic labour patterns.

Beyond measurement issues, a conceptual point that our data does not allow to address at this point is that long-run changes in gendered labour patterns should also be understood at the level of households and families rather than as the aggregation of independent individual decisions. In particular, models of household labour supply with home production emphasize that economic work and domestic labour are substitutes chosen jointly within families, so that changes in economic hours need not translate into changes in total labour time (Albanesi et al., 2023). This pleads in favour of considering the evolution of total labour hours and not only economic work. While Gottlieb et al (2024) focus on married working-age men and women, we look at all working-age men and women (irrespective of marital status). This appears to

[14] We have few time-use surveys for Europe in the 1960s-1970s, but the main available surveys (in particular for France and Germany) all display very large domestic labour hours for women (almost 46 hours per week).

[15] Note however that time-use surveys are not perfectly homogeneous over time and do not cover exactly the same years for all countries within North America/Oceania, which might affect comparisons.

explain why Gottlieb et al (2024) find somewhat longer total labour hours than we do.[16] This does not affect the general finding that women work more than men in all countries. Further analysis that differentiates between household types and norms could greatly improve the understanding of gendered patterns of labour hours as well as the substitution between domestic and economic hours.

3.3. Paid vs Unpaid Work: A Global Assessment 1800-2025

Although available historical data sources are imperfect, it is possible to construct indicative estimates of the evolution of the share of paid and unpaid work at the global level over the 1800-2025 period. We first look at the share of unpaid work within economic labour. As shown in Figure 17, unpaid family work is estimated to be as large as 28% of total economic labour hours in 1800, and to be about 8% of total economic labour hours in 2025. As we go back in time, unpaid labour also includes slave labour (as recorded for instance by pre-1865 US censuses) or "corvée" labour and other types of forced labour in colonial empires until the 1940s-1950s (as recorded in colonial censuses and administrative sources).[17] These various forms of forced labour can represent very large shares in certain territories and time periods, e.g. as much as 90% of total economic labour hours in the British and French slave islands of the Caribbean until the abolition of slavery, and about 30-40% in Southern US (and about 10-15% for the US as a whole) before the Civil War and the end of slavery in 1865.[18] At the global level, one can estimate that forced labour made up about 6% of total economic labour hours between 1800 and 1860, down to about 3% in 1910 and about 1% in 2025.[19] Although 6% can seem relatively small, it should be noted that forced labour made the majority of labour hours in certain strategic economic sectors in 19th century, particularly in the export-oriented

[16] See Appendix Figure B12. There are other definitional differences which can contribute to explain the gaps. Our concept of "economic labour" is similar to what Gottlieb et al call "market labour". One difference is that they introduce a division between different categories of domestic tasks, with a distinction between "domestic" labour strictly speaking (cooking, cleaning, etc.) and "care" labour (child care, etc.), while we put everything into non-economic labour. The main difference in total labour hours seems to come from their focus on married men and women (and a different of countries and years).

[17] See Van Waijenburg (2018), who estimates on the basis of French colonial archives that "corvée" labour brought additional revenues equivalent to about 20-30% of colonial budgets (i.e. about 2-3% of GDP and 4-5% of total economic labour hours) in French Africa over the 1910-1940 period.

[18] See e.g. Piketty (2020, Figures 6.1-6.4 and Table 6.1, p.215-232). In Brasil, forced labour made about 15-20% of the workforce prior to the abolition of slavery in 1888. In Russia, forced labour made about 35-40% of the workforce prior to the abolition of serfdom in 1861. See op.cit., p.246-250.

[19] According to ILO (2022), there are currently about 28 million individuals in a situation of forced labour in the world. The historical estimates provided here include not only forced labour in Western colonies and territories but also in other world regions. See Online Appendix.

plantation economy until the 1860s. Including all forms of unpaid labour together (unpaid family work and forced labour), our estimates suggest that the share of unpaid labour declined from 34% in 1800 to 9% in 2025, and that unpaid labour has mainly consisted of women unpaid labour (see Figure 17).[20]

Turning now to total labour time, we also include hours spent on domestic work, which is entirely unpaid. We find that the share of unpaid labour time also appears to have declined in the long run, but in a much more limited manner (see Figure 18). In the long run, the decline in unpaid family work and forced labour has been to a large extent compensated by the rise of the share of domestic labour in total labour hours.[21] This illustrates the fact that these different forms of unpaid labour correspond to very different social realities and power relations. From a normative perspective, unpaid labour should certainly not be viewed as problematic. Assuming that it becomes equally distributed between women and men, the long-run rise of the share of domestic labour in total labor can be viewed as a positive transformation, reflecting a decline in economic labour (thanks to rising productivity). In the long run, one can very well imagine a scenario where economic labour pursues its historical decline, together with a rise in the share of domestic labour (and hence unpaid labour) in total labour hours, and where both economic and domestic labour would be equally distributed between men and women (see Section 5).

3.4. The Extended Gender Gap: Including Domestic Work

The magnitude of domestic work is substantial across all world regions and time periods and many authors have stressed the key role of domestic labour for the reproduction of society and the functioning of the overall economic and social system (see e.g. Bhattacharya (2017) and Arruza et al (2019)). Incorporating domestic labour into the measurement of gender inequality highlights a dimension of economic disparity that operates through household bargaining power

[20] The proportion of women among slaves varied across territories but was generally very small in 18th century plantation slavery system, as new male slaves were brought permanently from Africa (with huge mortality and very few women). By the end of the century and during the first decades of the 19th century, the system shifted to one were women made close to half of slaves and where natural reproduction was the main factor behind the growth of the slave population. In the US, women make 48% of the slave population in the census of 1820, 50% in the census of 1830 and 51-52% in the censuses of 1840, 1850 and 1860. See *Historical Statistics of United States*, Bicentennial Edition, 1976, Series A91-104.

[21] Here we assume that domestic labour follows the same long-run evolution as the cross-sectional and time-series patterns observed in recent decades. See Online Appendix for all details on these estimates. In practice, the absolute number of domestic labour hours appears to rise slightly with income level and then to stabilize (or maybe to decline slightly) at higher income levels (see Figures 1 and 13-15). Whatever the uncertainty about the exact historical evolution of domestic labour hours, there is no doubt that their share in total labour hours has declined enormously in the long run, given the very large fall in the absolute number of economic labour hours.

and long-run income dynamics rather than through hourly wages alone. Unequal allocations of unpaid labour affect women's labour market attachment, career progression, and lifetime earnings. From this perspective, unpaid domestic labour is not outside the labour market but enters equilibrium through its effects on labour supply, specialization, and wages, a mechanism emphasized in household models with home production (Albanesi et al., 2023). Despite its central role, domestic labour is rarely taken into account explicitly when measuring the gender gap in labour income. To overcome these limitations, we construct an "extended gender gap" indicator. Our objective is *not* to assign a monetary value to home production, nor to estimate a comprehensive measure of income, but rather to examine how gender gaps in labour income change once total labour time—including both paid and unpaid work—is taken into account.

Concretely, our approach does not rely on valuing domestic labour using replacement wages or opportunity costs, as in satellite-account methodologies (Ironmonger, 1996; Bridgman, 2016). Instead, we construct a simple, transparent indicator that compares the share of total labour income *received* by women and men to their respective shares of *total* labour hours supplied, where total labour hours are defined as the sum of economic and domestic labour hours. This measure can be interpreted as an average monetary return per hour of total labour time supplied, without attributing an explicit wage to domestic work. In this sense, the indicator captures how unequal allocations of unpaid labour interact with paid labour to shape effective income per unit of total work, rather than providing a valuation of home production itself.

We can first illustrate this general point with the case of Europe. According to the most recent available evidence (2020-2025), women receive about 39% of total labour income in Europe and they supply about 42% of total economic labour hours. Therefore, if we compute the average hourly labour income of women and men on the basis of economic work alone we find that the gender gap in hourly pay is not that large: the average hourly labour income of women appears to be 12% smaller than that of men. However, the picture looks quite different if we include domestic hours[22]. Women then supply 54% of total economic and domestic labour hours, which given that they receive only 39% of total labour income means that their average hourly income for any type of labour hour is 45% smaller than that of men (see Figure 19).

Given the key role played by domestic labour for the overall functioning of modern economic and social systems, we feel that the "extended gender gap" indicator provides an interesting perspective that complements the conventional indicators that exclude domestic labour from the analysis.

[22] We do not apply a different weighting for non-economic labour hours compared to economic labour hours. This should be understood for the gap in pay for one hour of non-leisure or rest time.

If we use standard indicators based on economic labour only, then we find that the gender gap in hourly pay is relatively limited – about 10-20% or less – in the most advanced economic regions (see Figure 20). The gender gap even seems to be close to 0% in Latin America in recent years. This result does not contradict the existing literature on gender earnings inequality in Latin America that shows that once observable characteristics such as education, occupation, and sector are accounted for, gender earnings gaps remain substantial (e.g. Marchionni et al., 2019; Gontero and Ravest, 2025). The near-zero gap we document reflects unadjusted differences in average earnings, which combine compositional effects with wage-setting differentials. A large body of evidence shows that in Latin America women often have equal or higher levels of education than men, yet remain concentrated in lower-paying occupations and sectors, leading to substantial adjusted gender earnings gaps. Small unadjusted gaps can therefore coexist with large adjusted gaps in the region.

Also note that, with this indicator, the most unequal region appears to be South & South East Asia. Women in this region do receive a slightly larger share of labour income than in Middle East/North Africa (see Figure 2), but they supply so many more hours of economic labour that their relative hourly income is even worst (see Figure 20).

If we use our indicator of "extended gender gap" based on economic and domestic labour, then the order of magnitudes change substantially (see Figure 21). In the most advanced regions of the world like Europe or North America/Oceania, we find that the gender gap in hourly pay is now about 40-50% or more: men receive about twice as much monetary income than women for each labour hour that they provide. In regions like South and South-East Asia or MENA), the gender gap is as large as 80-90%: men receive as much as 10 times more monetary income than women for each labour hour that they provide. The advantage of this indicator is that it clearly illustrates the magnitude of unpaid labour in modern economic systems. Note that we are not suggesting that domestic labour should receive monetary compensation; rather, unequal allocations of unpaid and paid labour are likely to have implications for bargaining power, income dynamics, and human capital accumulation.We return to this discussion in Section 5.

A related perspective on economic vs domestic labour stresses the connections between the two spheres. Indeed, the domestic burden that accrues to women prevents them from participating to the labour market or from accessing highly paid jobs. As highlighted by Goldin (2014), labour markets in developed economies disproportionately reward individuals who work long hours. In couples with children, spouses will tend to specialize with men taking the less flexible/higher paid jobs in the corporate and financial sectors while women take more flexible/lower paid jobs in the public and social sectors. Similarly, Kleven et al. (2019) show that 80% of the remaining earnings inequality between men and women in Denmark results

from "child penalties" faced by mothers. Cross-regional differences in these patterns are likely mediated by institutional arrangements such as childcare provision, parental leave systems, and norms surrounding family responsibilities, which shape how demographic and economic forces translate into gendered labour allocations.

4. The Rise of Productivity and the Decline in Labour Hours, 1800-2025

4.1. The Long-Run Rise of Hourly Productivity

We now relate the long-run decline in economic labour hours to the long-run rise in economic productivity. In order to compute productivity, we simply divide net domestic product (NDP), i.e. gross domestic product (GDP) minus capital depreciation (CFC), by total annual hours of economic labour. We use the historical dataset on NDP covering 57 core territories over the 1800-2025 period provided by the World Inequality Database (WID).[23] It is conceptually more satisfactory to use NDP rather than GDP to measure productivity, but in practice it does not make a huge difference in terms of long-term trends, as CFC represents a relatively stable fraction of GDP.[24] All our results and NDP series used here are expressed in purchasing power parity (PPP 2025 €).[25] For annual hours of economic labour, we use the series constructed in the present research.

We obtain the following results. At the global level, per capita annual NDP rose from about 900€ in 1800 to 14,000€ in 2025: it was multiplied by about 15, which corresponds to an average real growth rate of 1.2% per year (see Figure 22). Given the long-run decline in annual labour hours per capita, this implies that hourly NDP has grown even more, from about 0.7€ in 1800 to 16€ in 2025: hourly productivity was multiplied by about 24, which corresponds to an average real growth rate of about 1.5% per year (see Figure 23). Together with this dramatic productivity growth, huge gaps persist between countries. In the latest available estimates,

[23] WID historical national accounts series combine Maddison series with new country-specific series (when available). See Chancel and Piketty (2021), Moshrif et al (2024), Gomez-Carrera et al (2024) and Nievas and Piketty (2025). Complete series and methodological details are available on wid.world.

[24] CFC actually tends to rise over time (capital obsolescence effect): it typically ranges from less than 10% of GDP in the 19th century to as much as 15-20% of GDP in the most advanced economies in the early 21st century. This implies that the long-run rise of hourly NDP is somewhat smaller than that hourly GDP. As compared to the magnitude of long-run growth trends, this is not a very large effect, however. See Dietrich et al (2025).

[25] Namely we use the results from the latest round of the International Comparison Program (ICP 2021) that were published in 2024. There are some gaps with the previous round (ICP 2017), but they are relatively small as compared to the magnitude of the long-run trends studied here. See Gomez-Carrera et al (2024).

hourly productivity varies from as little as 4€ on average in Subsaharan Africa to as much as 55-60€ in the richest countries of the world in Europe. If we look at individual countries, we find the US and top European countries (Germany, Sweden or France) have productivity levels that are virtually indistinguishable in recent years (see Figure 23).[26] In other words, the fact that the US have higher per capita GDP in PPP terms (with a gap of about 20-30% with top European countries in the latest available years) comes entirely from longer labour hours.

Several remarks are in order here. First, while the growth rate of hourly productivity has been on average about 1.5% per year at the global level over the 1800-2025 period, we also observe very large variations over time and across countries. Generally speaking, productivity growth appears to have accelerated over time, from 1.1% per year over the 1800-1910 period to 1.9% over 1910-1950, 2.1% over 1950-1990 and 1.8% over 1990-2025 (see Table 4). The fastest historical examples of productivity growth include Europe over 1950-1990 (3.4% per year) and East Asia over 1950-1990 (3.7% per year, largely driven by Japan) and 1990-2025 (4.4% per year, mostly driven by China). These episodes typically correspond to patterns of convergence with the world productivity frontier (generally the US). At the world level, productivity growth rates have never been more than 1.5-2% per year over long time periods, which is already very large. Also note that the lowest productivity growth rates are observed in Subsaharan Africa, with only 1.2% per year on average between 1990 and 2025. This is better than between 1950 and 1990 (0.5% per year), but remains below the world average. Generally speaking, the global picture offers a sharp contrast of convergence episodes between certain regions and persistent inequality between others.

We stress that there are obvious limitations in our collective ability to measure both NDP and labour hours: so that it is better to concentrate on the global patterns and the broad orders of magnitude, rather than on small differences between countries. In principle, we have tried to measure labour hours in a way that is as comparable as possible across countries and over time. However, there are many possible measurement errors such that small variations in productivity over time or across countries should be interpreted with caution. In contrast, large variations over time and across countries should be considered as robust and meaningful.

[26] See Online Appendix for complete country series. The fact that the US and top European countries have virtually indistinguishable hourly productivities holds with our series as well as with OECD and BLS series. See also Ward et al (2018, Figure 4.2), who show that this conclusion prevails using different methods to measure labour hours. Generally speaking, the main differences between our database and the OECD or BLS series on annual labour hours are twofold. First, we attempt to go back to micro data, employment surveys and time-use surveys in order to construct series that are as comparable and homogenous as possible. In practice, regarding OECD countries, our series are very close to OECD and BLS series for recent decades. Next, and most importantly, we adopt a long-run perspective and cover all world regions. Note that there exists a relatively large literature studying annual labour hours and hourly GDP across OECD countries. See e.g. Bergeaud, Cette and Lecat (2016, 2018). The main novelty here is the global perspective (as well as the historical and prospective dimension).

Next, and maybe most importantly, one should interpret with caution the variations in hourly NDP over time and across countries. By definition, NDP is based for the most part on the market value of the output produced by the various countries. Higher hourly productivity, as measured by hourly NDP, partly reflects differences in the productivity of human labour, due in particular to differences in human capital and educational investment. It is not a coincidence if the US – which has been the productivity leader of the world during most the 20th century – has also been for a long time the educational leader of the world (Goldin, 2001). However, it would be misleading to attribute all differences in hourly NDP to gaps in human capital. Variations in hourly NDP reflect many other factors, including the availability of equipment, machinery, patents, as well as the patterns of sectoral specialization and interstate power relations in the global division of labour (see e.g. Pomeranz (2000), Parnasarathi (2006), Beckert (2015), Piketty (2020, 2022)).

Finally, one should be particularly careful when interpreting large productivity growth over long periods of time. When hourly NDP is multiplied by 24 between 1800 and 2025 at the global level, this does not mean that labour productivity was multiplied by 24 for all goods and services. In practice, the pace of productivity growth has been very diverse in the different economic sectors. Most importantly, long-run economic growth is characterized by rising diversification of products in all sectors, as well by major structural transformation: the agricultural sector has been largely replaced by manufacturing and the services in the 19th and the 20th centuries, and the manufacturing sector is to a large extent already scheduled to be replaced by the services in the 21st century. This has major consequences for the sustainability of economic growth, and any single-dimensional measure of productivity is bound to be a simplification of reality. We return to this discussion in Section 5.

4.2. The Negative Elasticity of Labour Hours with Respect to Productivity

In order to analyse the relation between labour hours and productivity, the simplest way to proceed is to run a regression of the following form:

$$\text{Log}(\text{LabourHours}_{it}) = a + b\ \text{Log}(\text{Productivity}_{it}) + e_{it} \qquad (2)$$

With: LabourHours_{it} = average annual labour hours in country i and year t
Productivity_{it} = hourly productivity (hourly NDP) in country i and year t

In our baseline specifications using the entire time span (1800-2025), we find negative elasticities of labour hours around -0.15. The elasticities are similar whether we use average annual labour hours per employed individual or per working-age individual (see Table 5).

Intuitively, an elasticity of -0.15 means that labour hours decline by 0.15% when hourly productivity rises by 1%. To put it another way, if productivity is multiplied by 24, then labour hours should decline by about 40%. This is fairly substantial: this corresponds to a situation where about 40% of the rise in productivity was used to reduce labour hours and obtain extra leisure, so that per capita NDP was multiplied by 15 (rather than 24). The estimations show that approximatively 40% of the historical rise in productivity was used to increase leisure and 60% was used to increase production.

In standard neo-classical economics, the usual interpretation of such a negative elasticity is that income effects dominate substitution effects. Using standard consumer theory, the choice of shorter labour hours in response to higher productivity reflects the fact that the representative agent is characterized by large income effects. With higher productivity and higher income, rational agents choose to consume more leisure in order to derive more utility, in spite of the rise in the "relative price" of leisure (substitution effect). This neoclassical reasoning is interesting because it stresses the role of utility for leisure, which likely played a role in the evolution of labour supply.

That being said, this neoclassical interpretation of the observed historical elasticity of labour hours is probably incomplete. In practice, labour hours are not freely chosen by workers. Labour hours are determined by a complex collective process involving bargaining power of employers and workers, labour institutions and trade unions, state legislation and policy platforms. Employers generally have incentives to extend labour hours at given wages, while workers' ability to reduce working time depends on institutional and political constraints. In this perspective, we use the term "political elasticity" to denote the empirical relationship between productivity growth and labour hours that reflects not only individual preferences, but also the evolving balance of power, institutions, and collective action shaping work-time outcomes. Importantly, this concept is descriptive rather than structural: it does not identify a single causal mechanism, but summarizes how labour hours historically responded to productivity changes under given social and political conditions. Collective coordination matters because individual workers can face constraints in reducing hours unilaterally if others do not do so, creating coordination problems that are resolved through collective agreements or legislation. The fact that labour hours of the self-employed often move in the same direction as those of wage-earners is consistent with a role for social norms, institutions, and policies in shaping work-time outcomes. We illustrate these mechanisms below with three striking evolutions that link together historical evolutions in political thinking and our data on labour hour decrease.

First, it is interesting to note that worktime reduction was especially important during the 1860-1980 period, which coincides with the period of maximal strength of the labour and socialist

movement. The fact that historical worktime reduction was larger in Europe (the birthplace of the labour movement) than in the US seems to also favour this interpretative hypothesis.[27] We estimate a substantially smaller elasticity of labour hours if we restrict ourselves to the post-1980 period, a period with declining union power and socialist mobilization (see Table 4). The fact that the cross-sectional elasticity using contemporary data is lower than the historical elasticity could also be due to additional factors, including a possible "leisure satiation" effect since the 1980s-1990s. The private value of additional leisure was arguably much larger when labour hours were as large as 50-60 hours per week (with no paid vacation) than it is today with 40 hours per week and several weeks of paid vacation. This could potentially contribute to explain the lowering of the elasticity since the 1980s-1990s.[28]

If allocation of productivity gains depends on political environment, there should be variation in elasticities across space, additionally to the one we already denote through time. We launch an alternative regression in Appendix Table TC4 that introduces a regional fixed effect and interactions of these fixed effects with our coefficient of interest. Although the negative and significant elasticity of hours to productivity remains, magnitude of the effect separates our sample into two buckets: the elasticity is twice as large for Europe, Sub-Saharan Africa an South-South East Asia than for the rest (NAOC, MENA, RUCA, East Asia and LATAM). Although there are many explanations for these disparities – productivity gains being lower in Sub-Saharan Africa than other regions, even light reduction in annual hours worked translate into large elasticities, for example – this robustness checks further supports our interpretation of a "political elasticity", rather than an universal regularity.

Finally, note that the period of rising labour hours observed in the late 18th century and in the early 19th century also seems to fit well with the notion of a "political" elasticity. Rising labour hours between the 1770s-1780s and the 1830s-1840s are well documented in the context of European manufacturing, with extremely long and rising weekly hours (60 hours or more) and an increase in the number of work days per year (see e.g. Reid (1976), Voth (1998, 2001) and Allen and Weidsorf (2011)). These very long work hours should be analysed in the context of

[27] Some authors have argued that lower work hours in Europe could be interpreted as a neoclassical response to higher taxation (see e.g. Prescott (2004)). However this interpretation does not square very well with the large historical reduction of work hours in Europe, which started much before the rise of modern taxation. Also, by using contemporary micro data from LFS surveys covering over 80 countries, Bick et al (2018, 2022) show that higher productivities and hourly wages (and not higher tax rates) are the primary determinants of lower working hours.

[28] Other potential explanations for the fact that cross-sectional elasticities using contemporary data are lower than historical elasticities include technological change. I.e. available technologies were arguably more labour intensive for early industrializers in 19th century Europe than they have been for late industrializers in recent decades in other parts of the world. See e.g. Voth (2001).

the unorganized urban proletariat of the time, weak workers' power relative to employers and very low wages. In other words, workers were working longer and longer hours because employers were able to impose them and workers lacked the power and organizational capacity to oppose this. This interpretation – illustrated by our labour hours data in Figure 4 - is consistent with available evidence showing a marked decline in average height in the UK between the 1770s-1780s and the 1830s-1840s (Nicholas-Steckel, 1991).[29]

5. How Will Labour Hours and Productivity Co-Evolve over 2025-2100 period?

We now come to the discussion of future possible trajectories. The main goal for this exercise is to illustrate descriptively the interlinks and implications of the different country series we build in this paper, and to showcase our contribution, rather than to make a predictive or normative claim. To show the range of equilibria that coule be reached, we focus on two main scenarios: a "Business-As-Usual" scenario and a "Global-Convergence" scenario. In the "Business-As-Usual" scenario, we assume that the trends observed during the 1990-2025 period extend to the 2025-2100 period, both in terms of productivity growth, labour hours, gender gaps and sectoral structure. This leads to a perpetuation of very high inequality between countries and between genders. In the "Global-Convergence" scenario, we assume an accelerated process of convergence toward more equality setting two equalities at the end of the century: productivity equality between countries and allocation of labour hours across activity type equality across genders between genders. This convergence bears implications for total productivity, and we try to reach a more realistic end-of-century productivity scenario by accounting for the fact that elasticity of leisure to productivity could be higher then than what it has been in the past, considering somewhat larger acknowledgement of planetary habitability boundaries. A range of intermediary scenarios concerning the choice of this parameters and the vast array of trajectories in between our two key scenarios are important to highlight and are the object of ongoing, separate work. Our objective here is not to predict the future, but rather to highlight the diversity of potential trajectories, in light of historical evidence.

In the "Business-as-Usual" scenario, we assume that the hourly productivity growth rates observed in each country and world region between 1990 and 2025 extend until 2100. The consequence is a perpetuation of very high inequality between countries, and in some important

[29] On wage stagnation in the late 18th century and the first half of the 19th century, see Allen (2009). One alternative explanation for the "industrious revolution" is the idea that households responded to increasing diversity of consumer goods by supplying more market labour. See De Vries (1998, 2004). While this explanation might have some relevance for certain sectors and social groups, this does seem to be consistent with the evidence on low wages and declining living standards.

cases an enlargement of inequality (see Figure 25). In particular, Subsaharan Africa will experience very slow productivity growth (1.2% per year, vs 1.6% for the world average). As a consequence, hourly productivity will rise only modestly in Subsaharan Africa, from 3.9€ in 2025 to 9.4€ in 2100 (PPP 2025 €). Over the same period, hourly productivity will rise from 15.8€ to 52.1€ at the world level, from 48.2€ to 136.8€ in Europe and from 52.9€ to 150.1€ in North America/Oceania (see Table 6). In practice, this "Business-as-Usual" scenario can lead to a highly unstable and unsustainable trajectory. In particular, large and widening North-South inequalities can have explosive geopolitical consequences, especially in a context of rising climate damages incurred by the South and major demographic imbalances. According to UN demographic projections, the population of Subsaharan Africa is scheduled to reach 3.3 billion by 2100 (vs 1.3 billion in 2025), which is likely to lead to enormous migration pressures if productivity levels and living standards stagnate in this region (Gomes-Carrera et al (2024)).

In the "Global-Convergence" scenario, we assume instead that productivity levels will converge to about 100-120€ in all world regions by 2100 (see Figure 26). This implies very fast productivity growth in the poorest world regions, e.g. 4.5% per year between 2025 and 2100 in Subsaharan Africa (see Table 6). Although this is indeed very fast, this is approximately the same growth rate as that observed in East Asia between 1990 and 2025 (see Table 4). That being said, such a fast catch-up process can happen only if a number of conditions are met. First, it entails that the poorest regions in the world benefit from massive investment plans in human capital (especially education and health) and in infrastructures (in particular new energy and transport systems), together with a transformation of the trade regime and the international economic system which would allow these countries to find an adequate sectoral specialization.

Next, it should be noted that this accelerated catch-up process comes with a substantial increase of the global productivity growth rate between 2025 and 2100: 2.6% in the "Global-Convergence" scenario, vs 1.6% in the "Business-as-Usual" scenario (see Table 6). Whether such an accelerated growth pattern is compatible with climate objectives, the size of the remaining carbon budget and the preservation of planetary habitability remains to be demonstrated. At the very least, for such a scenario to be sustainable, large sectoral reallocation of labour time away from the most polluting sectors would need to occur (see Figure 27).

Larger production comes with implications in terms of material footprint and welfare. We encompass the possibility that this could be accounted for by working with a slightly higher labour productivity elasticity than observed descriptively from periods where human activity effects on planetary habitability was not accounted for.. In our central scenario, this means that annual economic labour hours per worker would decline to about 1000 hours by 2100 in all world regions (see Figure 28). How this affects welfare will depend crucially on the gender

division of work: we assume full gender equality by 2100, with employment rates equal 80% for working-age men and women (see Figures 29-30) and an equal sharing of domestic work and labour income (see Figure 31).[30] In effect, according to this scenario, 45% of productivity gains would be devoted to worktime reduction, and living standards would reach about 50-55k € in all world regions by 2100, a level more than 30% higher than the level observed today in North America/Oceania (see Table 7). In an alternative, intermediate scenario, we can assume that annual labour hours would decline to about 1260 hours by 2100. 31% of productivity gains would be devoted to worktime reduction, and living standards would reach about 60-65k € by 2100 (see Table 8). Both scenarios of worktime reduction might seem too ambitious to some readers. However, the fraction of productivity gains that we assume will be devoted to worktime reduction in the future is relatively close to what was done on average over the past two centuries (see Table 9). This does not mean that this would happen easily: one the main lessons from the history of labour time is that worktime reduction requires sizable political mobilization, large-scale social struggles and massive institutional and legislative transformations. As compared to the mobilizations of the past, which took place in a context of very long working hours and relatively low living standards, the mobilizations of the future will take place in a setting characterized by relatively lower working hours, high living standards and massive environmental damages. The lessons from past mobilizations can help but old strategies will likely not suffice to address the challenges of the future.

Needless to say, many aspects of the "Global-Convergence" scenario should be analysed in a more detailed manner by future research. In particular, one additional advantage of accelerated productivity growth in the world's poorest regions is that this is likely to reduce demographic pressures and therefore environmental pressures. In practice, as the various scenarios analysed in UN projections illustrate, the impacts on total population could be very large. Instead of a world population around 10 billion inhabitants by 2100 (the level associated to the "Business-as-Usual" scenario), the "Global-Convergence" scenario could lead to a world population around 8-9 billion inhabitants.

Finally, one central aspect of the "Global-Convergence" scenario is that it includes a sharp compression of gender inequality in labour hours: employment-to-population ratios, economic labour hours and domestic labour hours are scheduled to be the same for women and men in all world regions at the latest by 2100. In the same way as for worktime reduction and the preservation of planetary habitability, this is an objective that is very widespread among the new generations in many parts of the world, but which will require enormous political mobilizations and massive changes in institutions, public policies and social norms in order to

[30] Reaching 80% employment ratios for men and women could also be facilitated by the development of adequate policies and institutions like the "job guarantee" program (see e.g. Tcherneva (2020)).

materialize. A number of policy tools in favour of gender equality could be systematized and reinforced, including equal parental leave, anti-discrimination rules, gender quotas for job promotion. More radical tools could also play a role in order to rebalance power relations within households, including fiscal equalization of income between women and men. Generally speaking, policies aiming at compressing income and wealth scales are very complementary to gender equality policies, as men are massively overrepresented in top income and wealth brackets. These issues should be considered as top priority for future research.

6. Concluding Comments and Research Perspectives

In this paper, we have offered a global historical perspective on labour hours covering the 1800-2025 period, as well as a prospective analysis for the 2025-2100 period drawing upon the lessons from history. We have stressed the importance of worktime reduction in the long-run and the key role of political mobilizations and social struggles to deliver these changes. We have also analyzed the multifaceted transformations in the patterns of gender inequality over labour hours, and the (very) slow movement toward more gender equality in recent decades. Finally, we have emphasized that both structural transformations – worktime reduction and gender equality – should continue their historical trajectory in the 21st century, in the context of rising social demand for the preservation of planetary habitability and socioeconomic justice. We have briefly described some features of a possible "Global-Convergence" scenario and its main differences with the "Business-as-Usual" scenario (based upon the continuation of recent trends), but it is clear that a lot more research is needed to better understand the social, economic and political conditions under which these various possible trajectories are likely to take place.

First, a better understanding of the historical evolution of productivity differentials between countries would require the analysis of long-run series on (non-human) capital stock and capital shares, as well as on human capital investment. One would also need to explicitly consider the role of unequal exchange patterns and trade rules, as well as the impact of within-country inequality on productivity growth. Next, the study of productivity growth, labour hours and structural transformation in the 21st century should rely extensively on detailed analysis of sectoral shifts, carbon emissions by sector and more generally on the impact of socioeconomic development on planetary habitability. Finally, and maybe most importantly, future research should also focus upon the political strategies and the political coalitions which can contribute to make these various trajectories viable. We very much hope that the present paper will contribute to stimulate future research in this area.

References

Acemoglu, D., & Autor, D. (2011). Skills, tasks and technologies: Implications for employment and earnings. In *Handbook of labor economics* (Vol. 4, pp. 1043-1171). Elsevier.

Aguiar, M., & Hurst, E. (2007). Measuring trends in leisure: The allocation of time over five decades. *The Quarterly journal of economics*, *122*(3), 969-1006.

Albanesi, S., Olivetti, C., & Petrongolo, B. (2023). *Chapter 5 – Families, labor markets, and policy.* In **Handbook of the Economics of the Family**.

Alesina, A., B. Sacerdote, E. Glaeser, "Why Doesn't the United States Have a European-Style Welfare State?", Brooking Papers on Economic Activity, 2001.

Allen, R. « Engels' Pause: Technical Change, Capital Accumulation, and Inequality in the British Industrial Revolution », Explorations in Economic History, 2009.

Allen, R. , J. Weisdorf, "Was There an 'Industrious Revolution' before the Industrial Revolution? An Empirical Exercise for England, c. 1300-1830", *The Economic History Review*, 2011, vol. 64/3, pp. 715-729.

Ashton, T. S. (1997). *The industrial revolution 1760-1830*. Oxford University Press.

Arruza, C., T. Bhattacharya, N. Fraser, *Feminism for the 99%. A Manifesto*, Verso, 2019.

Bhattacharya, T., *Social Reproduction Theory. Remapping Class, Recentering Oppression*, Pluto Press, 2017.

Bergeaud, A., G. Cette, R. Lecat, "Productivity Trends in Advanced Countries Between 1890 and 2012", *Review of Income and Wealth*, 2016, 62(3), p.420-444.

Bergeaud, A., G. Cette, R. Lecat, "The Role of Production Factor Quality and Technology Diffusion in Twentieth-Century Productivity Growth", *Cliometrica*, 2018, 12, p.61-97.

Bick, A., N. Fuchs-Schundeln, D. Lagakos, "How Do Hours Worked Vary with Income? Cross-Country Evidence and Implications", *American Economic Review*, 2018, vol. 108(1), pp.170-199.

Bick, A., N. Fuchs-Schundeln, D. Lagakos, H. Tsujiyama, "Structural Change in Labour Supply and Cross-Country Differences in Hours Worked", *Journal of Monetary Economics*, 2022.

Boppart, T., & Krusell, P. (2020). Labor supply in the past, present, and future: a balanced-growth perspective. *Journal of Political Economy*, *128*(1), 118-157.

Boserup, E. (2014). *The conditions of agricultural growth: The economics of agrarian change under population pressure*. Routledge.

Bridgman, B. (2016). Home productivity. *Journal of Economic Dynamics and control*, *71*, 60-76.

Bridgman, B., Duernecker, G., & Herrendorf, B. (2018). Structural transformation, marketization, and household production around the world. *Journal of Development Economics*, *133*, 102-126.

Broadberry, S., Campbell, B. M., Klein, A., Overton, M., & Van Leeuwen, B. (2015). *British economic growth, 1270–1870*. Cambridge University Press.

Cette, G., Drapala, S., & Lopez, J. (2023). The circular relationship between productivity and hours worked: A long-term analysis. *Comparative Economic Studies*, *65*(4), 650-664.

Cha, Y. (2010). Reinforcing separate spheres: The effect of spousal overwork on men's and women's employment in dual-earner households. *American Sociological Review*, *75*(2), 303-329.

Chancel, L., T. Piketty, "Global Income Inequality 1820-2020: The Persistence and Mutation of Extreme Inequality", *Journal of the European Economic Association*, 2021, vol. 19(6), p.3025-3062 (WIL Working Paper 2021/19).

De Vries, J., « The Industrial Revolution and the Industrious Revolution », Journal of Economic History, 1994.

De Vries, J., *The Industrious Revolution. Consumer Behavior and the Household Economy, 1650 to the Present*, Cambridge University Press, 2008.

J. Dietrich, G. Nievas, M. Odersky, T. Piketty, A. Somanchi, "Extending WID National Accounts Series: Institutional Sectors and Factor Shares", WIL TN 2025/03

Dilli, S., S.G. Carmichael, A. Rijpma, "Gender Equality since 1900", in *How Was Life? Vol.2: New Perspectives on Global Inequality and Well-Being since 1820*, OECD, 2021.

Dinkelman, T., Ngai, L. R, *Time use and gender in Africa in times of structural transformation,* Journal of Economic Perspectives, 36(1), 57-80, 2022

Fuchs-Schundeln, N., "Trends in Hours Worked: Past, Present and Future", 2024 PSE-BdF Lecture.

Gethin, A., Saez, E., "Global Labour Time", 2025, World Bank & UC Berkeley

Gilmore, O., "The Working Week in Manufacturing since 1820", in *How Was Life? Vol.2: New Perspectives on Global Inequality and Well-Being since 1820*, OECD, 2021.

Goldin, C., "Female Labor Force Participation: The Origin of Black and White Differences, 1870 and 1880", *Journal of Economic History*, 1977.

Goldin, C., "The U-Shaped Female Labor Force Function in Economic Development and Economic History", in T.P. Schultz, *Investment in Women's Human Capital and Economic Development*, University of Chicago Press, 1995, p.61-90.

Goldin, C., "The Human Capital Century and American Leadership: Virtues of the Past", *Journal of Economic History*, 2001.

Goldin, C. "A grand gender convergence: Its last chapter". *American Economic Review*, 2014, 104(4), 1091-1119.

Goldin, C., "Nobel Lecture: An Evolving Economic Force", *American Economic Review* 2024, 114(6), p.1515-1539

Gomez-Carrera, R., R. Moshrif, G. Nievas, T. Piketty, A. Somanchi, "Extending WID Population Series: Projections 2025-2100 & Age/Gender Breakdowns", WIL Technical Note 2024/15.

Gontero, S., & Ravest, J. (2025). Gender Pay Inequality in Latin America: What is the relevant gap to close? OIT.

Gottlieb, C., C. Doss, D. Gollin, M. Poschke, "The Gender Division of Work Across Countries", 2024, AMSE, Tufts and McGill.

Herrendorf, B., Rogerson, R., & Valentinyi, A. (2014). Growth and structural transformation. *Handbook of economic growth*, *2*, 855-941.

Herrendorf, B., Rogerson, R., & Valentinyi, A. (2021). Structural change in investment and consumption—a unified analysis. *The Review of Economic Studies*, *88*(3), 1311-1346.

Humphries, J. (2010). Through the Mill: Child Labour in the British Industrial Revolution.

Huberman, M., "Working Hours of the World Unite? New International Evidence of Worktime, 1870-1913", *Journal of Economic History*, 2004, 64(4), p.1964-2001.

Huberman, M., C. Minns, "The times they are not changin': Days and hours of work in Old and New Worlds, 1870–2000", *Explorations in Economic History*, 2007, 44, p.538-567.

International Labour Organization, *Global Estimates of Modern Slavery: Forced Labor and Forced Marriage*, 2022.

Ironmonger, D. (1996). Counting outputs, capital inputs and caring labor: Estimating gross household product. *Feminist Economics*, *2*(3), 37-64.

Keynes, J.M. (1930). *Economic Possibilities for our Grandchildren*. New York: W. W. Norton. Reprinted in *Essays in Persuasion*.

Kivimäki, M., Jokela, M., Nyberg, S. T., Singh-Manoux, A., Fransson, E. I., Alfredsson, L., ... & Virtanen, M. (2015). Long working hours and risk of coronary heart disease and stroke: a systematic review and meta-analysis of published and unpublished data for 603 838 individuals. *The lancet*, *386*(10005), 1739-1746.

Klasen, S., "What Explains Uneven Female Labor Force Participation Levels and Trends in Developing Countries?", *The World Bank Research Observer*, 2019, 34(2), p.161-197

Kleven, H., Landais, C., Søgaard, J. E. (2019). Children and gender inequality: Evidence from Denmark. *American Economic Journal: Applied Economics*, 11(4), 181-209.

Lindert, P. H., & Williamson, J. G. (2016b). *Unequal gains*. Princeton University Press.

Mammen, K., C. Paxson, "Women's Work and Economic Development", *Journal of Economic Perspectives*, 14(4), 2000, p.141-164.

Maddison, A., *Economic Growth in the West*, Twentieth Century Fund, 1964.

Maddison, A., *Phases of Economic Development*, Oxford University Press, 1982.

Marchionni, M., Gasparini, L., & Edo, M. (2019). Brechas de género en América Latina: Un estado de situación. CAF.

McMillan, M., Rodrik, D., & Verduzco-Gallo, Í. (2014). Globalization, structural change, and productivity growth, with an update on Africa. *World development*, *63*, 11-32.

Moro, A. (2015). Structural change, growth, and volatility. *American Economic Journal: Macroeconomics*, *7*(3), 259-294.

Moro, A., Moslehi, S., & Tanaka, S. (2017). Does home production drive structural transformation?. *American Economic Journal Macroeconomics*, 116-146.

Ngai, L. R., & Petrongolo, B. (2017). Gender gaps and the rise of the service economy. *American Economic Journal: Macroeconomics*, *9*(4), 1-44.

Neef, T., A.S. Robilliard, "Half the Sky? The Female Labour Income Share in a Global Perspective", WIL WP 2021/22.

Nievas, G., T. Piketty, "WID National Accounts Series: Updated and Extended Coverage 1800-2023", WIL TN 2025/02.

Ngai, L. R., C. Olivetti, B. Petrongolo, "Gendered Change: 150 Years of Transformation in US Hours", NBER WP 32475 (2024).

Nicholas, S., R. Steckel, « Heights and Living Standards of English Workers during the Early Years of Industrialization », *Journal of Economic History*, 1991.

Nyland, C. (1990). Capitalism and the history of work-time thought. In *The sociology of time* (pp. 130-151). London: Palgrave Macmillan UK.

Pencavel, J. (2015). The productivity of working hours. *The Economic Journal*, *125*(589), 2052-2076.

Piketty, T., *Capital and Ideology*, Harvard University Press, 2020.

Piketty, T., *A Brief History of Equality*, Harvard University Press, 2022.

Piketty, T., G. Zucman, “Capital is Back: Wealth-Income Ratios in Rich Countries, 1700-2010”, *Quarterly Journal of Economics*, 2014.

Polanyi, K. (1944). *The Great Transformation: The Political and Economic Origins of Our Time*. Beacon Press.

Pollard, S. (1963). Factory discipline in the industrial revolution. *Economic History Review*, 254-271. **“Factory Discipline in the Industrial Revolution”** —

Prescott, E.C., “Why Do Americans Work So Much More Than Europeans?”, *Federal Reserve Bank of Minneapolis Quarterly Review*, 2004, 28, 2–13.

Ramey, V. A., & Francis, N. (2009). A century of work and leisure. *American Economic Journal: Macroeconomics*, *1*(2), 189-224.

Reid, D., “The Decline of Saint Monday, 1766-1876”, *Past & Present*, 1976, Vol. 71, pp. 76-101.

Restuccia, D., Yang, D. T., & Zhu, X. (2008). Agriculture and aggregate productivity: A quantitative cross-country analysis. *Journal of monetary economics*, *55*(2), 234-250.

Rogerson, R. (2008). Structural transformation and the deterioration of European labor market outcomes. *Journal of political Economy*, *116*(2), 235-259.

Strazdins, L., Welsh, J., Korda, R., Broom, D., & Paolucci, F. (2016). Not all hours are equal: could time be a social determinant of health?. *Sociology of Health & Illness*, *38*(1), 21-42.

Tcherneva, P., *The Case for a Job Guarantee*, Polity, 2020

Thompson, E. P. ([1967] 2017). Time, work-discipline, and industrial capitalism. *Class: The Anthology*, 27-40.

Van Waijenburg, M., “Financing the African Colonial State: The Revenue Imperative and Forced Labour”, *Journal of Economic History*, 2018.

Voth, H., “Time and Work in Eighteenth-Century London”, *Journal of Economic History*, 1998, Vol. 58/1, pp. 29-58.

Voth, H., *Time and Work in England During the Industrial Revolution*, Oxford University Press, 2001.

Ward, A., M. Zinni and P. Marianna (2018), "International Productivity Gaps: Are Labour Input Measures Comparable?", OECD Statistics Working Papers, No. 2018/12.

Whaples, R. (1990). Winning the eight-hour day, 1909–1919. *The Journal of economic history*, *50*(2), 393-406.

Whaples, R. (1991). The shortening of the American work week: An economic and historical analysis of its context, causes, and consequences. *The Journal of Economic History*, *51*(2), 454-457.

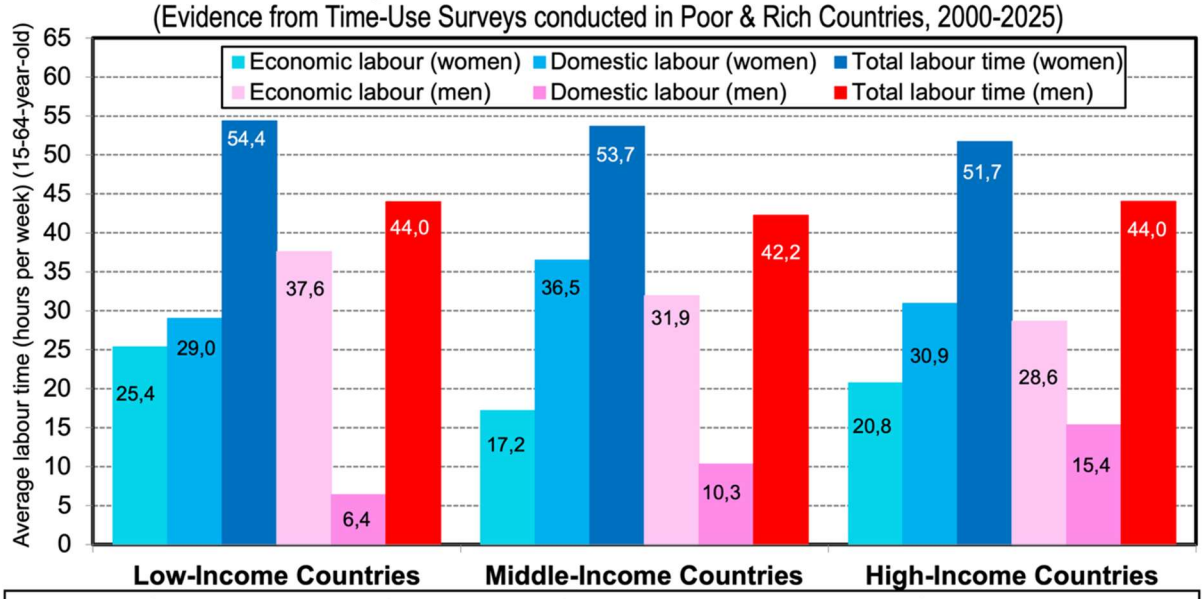
Table 1. Economic Labour vs Domestic Labour: Concepts Used in this Research

Economic Labour	Domestic Labour
Labour that is used as an input to produce **goods and services** that are **included in national accounts** **Economic labour** includes many forms of **market & non-market** labour, **formal & informal** labour, **paid & unpaid** labour, etc. Examples: **public school teachers or nurses/doctors** (valued at production costs); **unpaid family work in agriculture** (valued at output prices); etc.	Labour that is used as an input to produce **goods and services** that are **not included in national accounts** **Domestic labour** also includes many different forms of labour, and in particular **housekeeping tasks** (cleaning, cooking, child-caring, etc), **unpaid volunteering and community work**, etc. This excludes self-care, education and leisure time.

Note. Due to data limitations, the global historical labour hours database constructed in this paper focuses for the most part on economic labour. In effect, this is the only form of labour for which we can construct long-run series on labour hours and labour productivity covering two centuries (1800-2025) and a large set of countries. For recent decades (1960-2025), we also provide series on domestic labour for a subset of countries using time-use surveys.

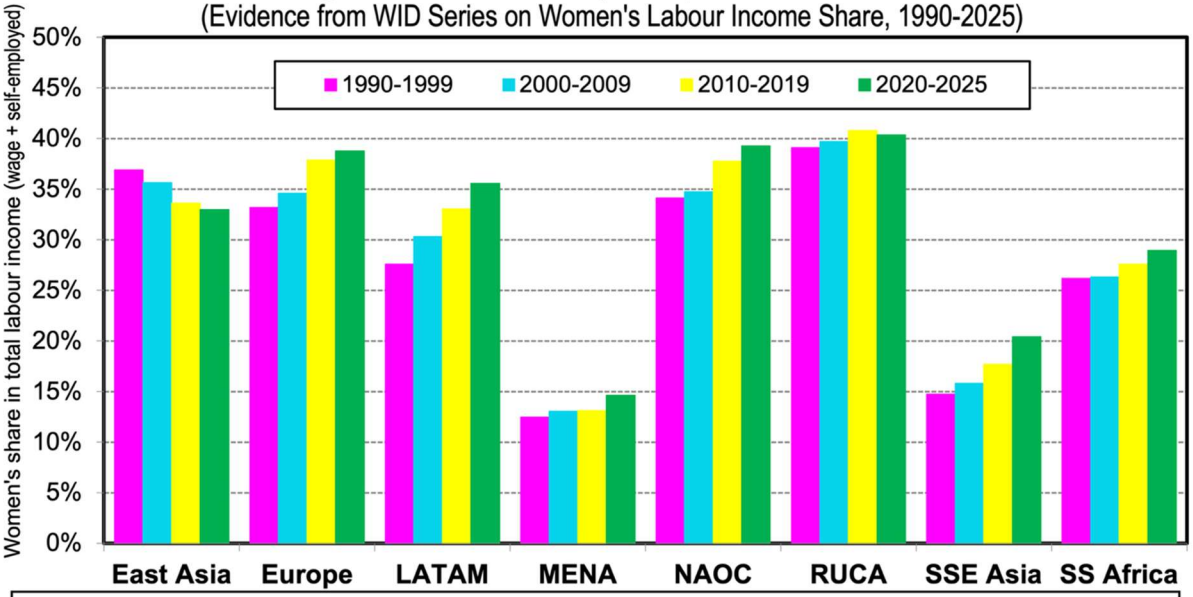
Fig. 1. Women Work More Than Men

(Evidence from Time-Use Surveys conducted in Poor & Rich Countries, 2000-2025)



Interpretation. If we look at total labour time (economic + domestic), women work more men in all categories of countries, particularly in low-income countries (per capita NNI<10k€ PPP 2023) & middle-income countries (btw 10k & 30k). **Note.** Economic labour includes labour used to produce goods & services included in national accounts. Domestic labour includes all other forms of labour: household cleaning, cooking, child-care, etc. Authors' computations using time-use surveys run in 35 countries over 2000-2025 period. **Averages are computed over all individuals aged 15-to-64** (employed or not). **Sources & series**: wid.world

Fig. 2. Women Earn (A Lot) Less Than Men
(Evidence from WID Series on Women's Labour Income Share, 1990-2025)

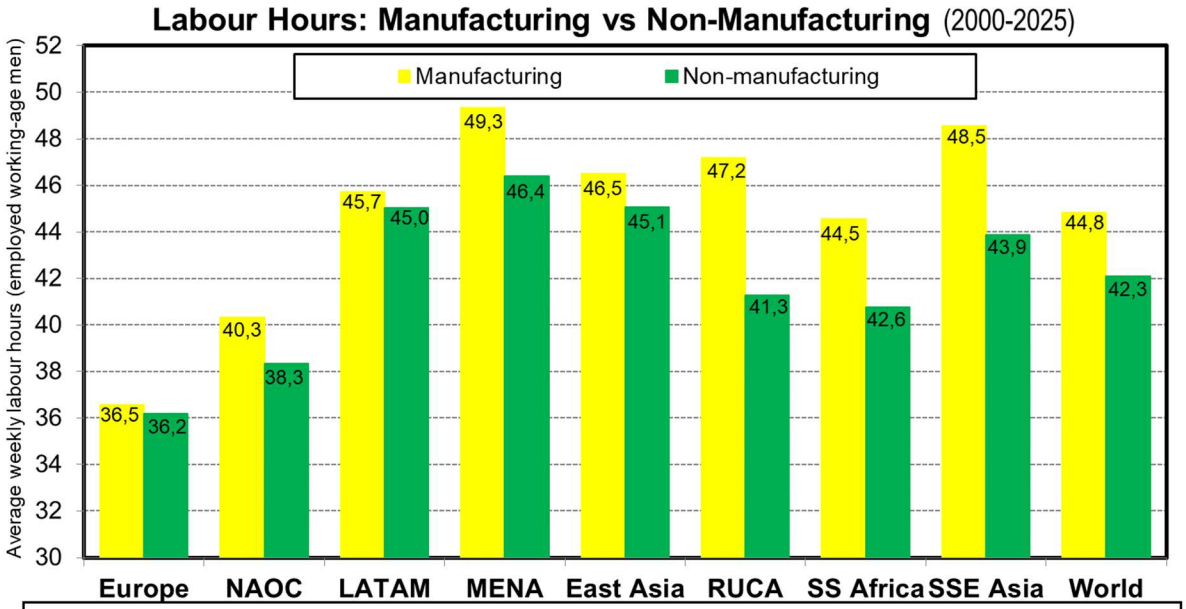


Interpretation. In 2020-2025, the share of women in total labour income (wage work+ self-employment) is a lot less than 50% in all world regions, from about 15-20% in Middle East/North Africa and South & South-East Asia to about 25-30% in Subsaharan Africa, 30-35% in East Asia and Latin America and 35-40% in Europe, North America/Oceania and Russia/Central Asia. **Sources & series**: wid.world

Table 2. A New Global Labour Hours Database: Geographical Coverage
(57 core territories = 48 main countries + 9 residual regions)

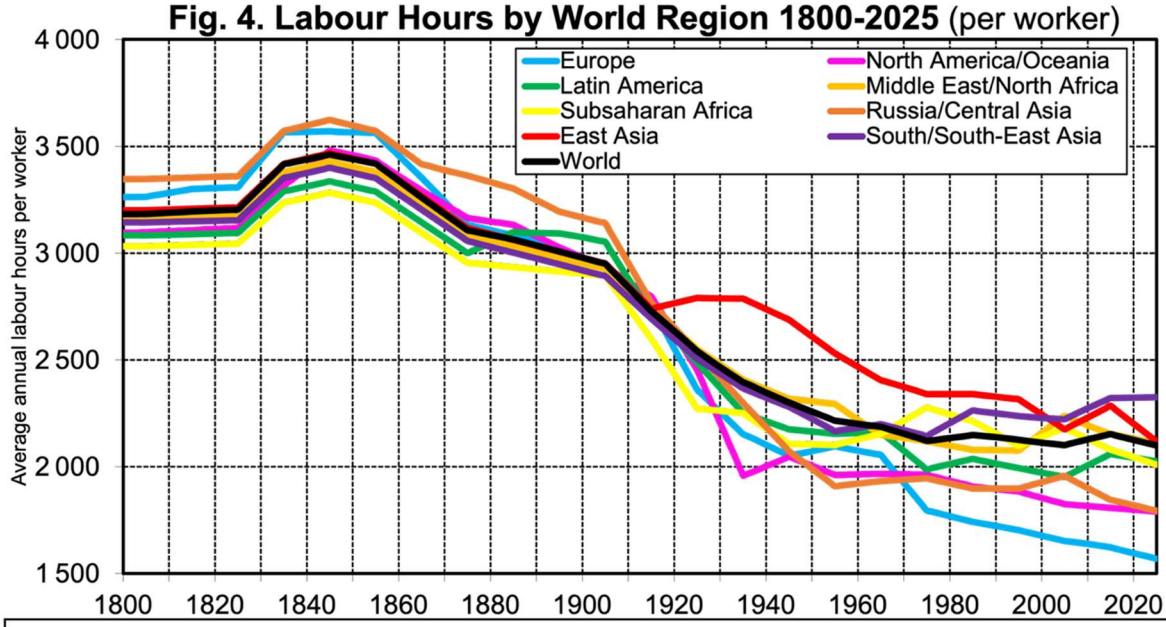
East Asia (5)	China, Japan, South Korea, Taïwan Other EASA
Europe (11)	Britain, Denmark, France, Germany, Italy, Netherlands, Norway, Spain, Sweden, Other W.EUR, Other E.EUR
Latin America (6)	Argentina, Brasil, Chile, Colombia Mexico, Other LATAM
Middle East/ North Africa (8)	Algeria, Egypt, Iran, Morocco, Saudi Arabia, Turkey, UAE, Other MENA
North America/ Oceania (5)	USA, Canana, Australia, New Zealand Other NAOC
Russia/Central Asia (2)	Russia Other RUCA
South/South-East Asia (9)	Bengladesh, India, Indonesia, Myanmar, Pakistan, Philipinnes, Thailand, Vietnam, Other SSEA
Sub-Saharan Africa (11)	DR Congo, Ethiopa, Kenya, Ivory Coast, Mali, Niger, Nigeria, Rwanda, Sudan, South Africa, Other SSAF

Interpretation. Our global historical database on labour hours aims to cover 57 core territories (48 main countries + 9 residual regions) over the 1800-2025 period. Whenever possible, we provide estimates for average annual working hours for working-age population (15-to-64-year-old) broken down by gender, status (wage work; self-employed; unpaid work) and employment sector (manufacturing vs non-manufacturing).



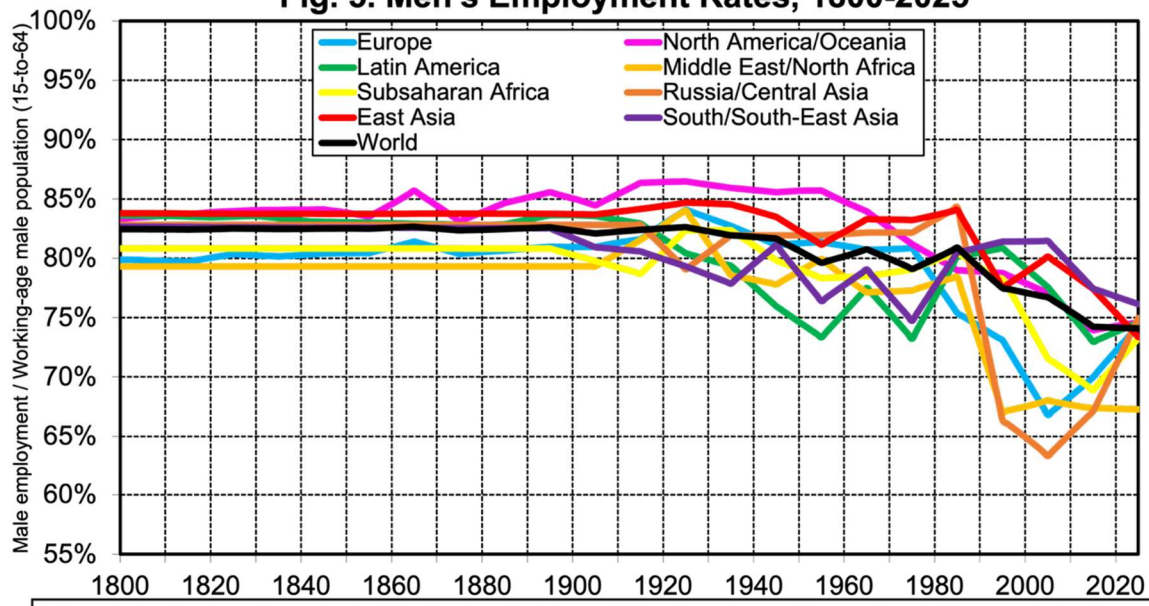
Interpretation. Average weekly economic labour hours are longer in the manufacturing sector than in the non-manufacturing sector, but the between-sector gap is relatively small as compared to the overall between-region gap. E.g. in Europe average weekly work hours for employed woorhing age-men (15-to-64-year-old) in 2000-2025 are 36,5 hours in manufacturing and 36,2 hours in non-manufacturing, vs 48,5 hours in manufacturing and 46,2 hours in non-manufacturing in South & Sout-East Asia. **Note.** Authors' computations using micro surveys run in 35 countries over 2000-2025 period. Averages are computed over all employed men aged 15-to-64. **Sources & series**: wid.world

Fig. 4. Labour Hours by World Region 1800-2025 (per worker)



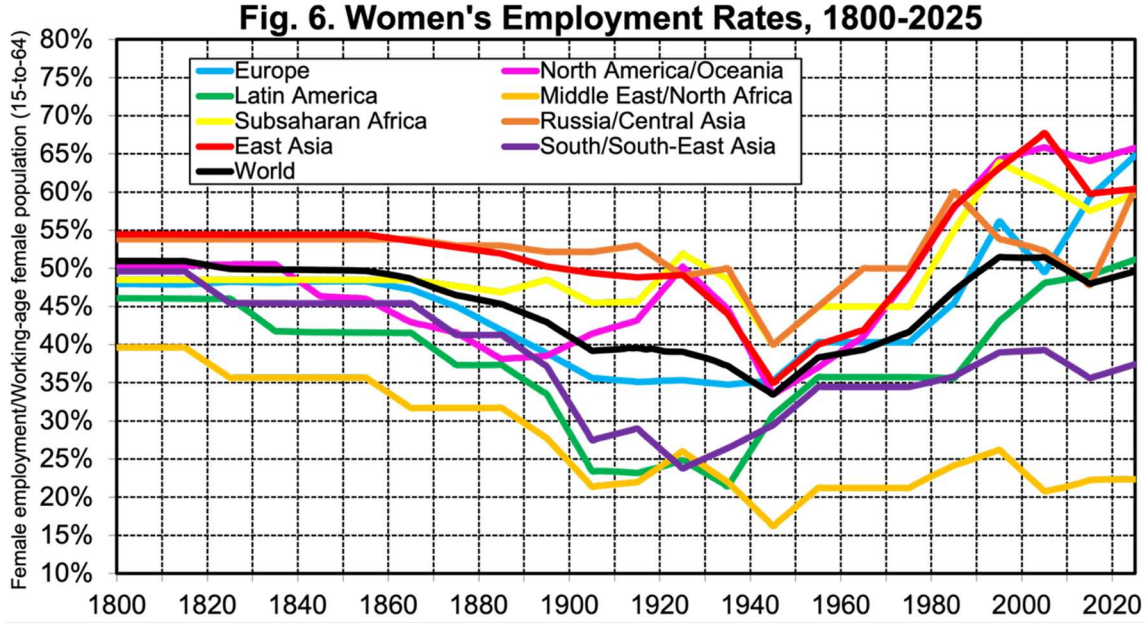
Interpretation. We observe a large long-run decline in average economic labour hours per worker (all employed persons aged 15-to-64 combined, irrespective of gender, employment status or sector). Annual labour hours around 3000-3500 hours correspond to about 60-65 hours per week all year long. Annual hours around 2000 hours correspond to 40 hours per week during 50 weeks (2 weeks in paid vacation) and annual hours around 1600 hours correspond to 35 hours per week during 47 weeks (5 weeks in paid vacation). **Sources and series**: see wid.world

Fig. 5. Men's Employment Rates, 1800-2025



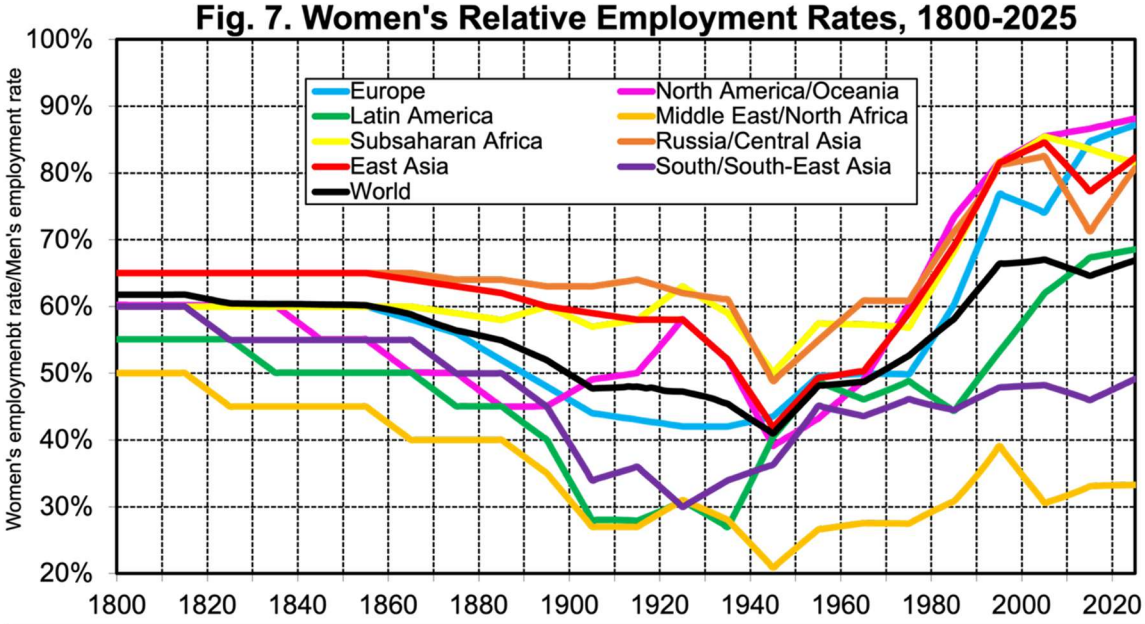
Interpretation. Men's employment rate, defined as the ratio between total male employment (irrespective of status or sector) and working-age male population (15-to-64-year-old), has been relatively stable around 80-85% at the global level in the long-run, with a gradual decline in recent decades due to a variety of factors (late entry of younger generations into labor market due to educational advances, early retirement of older generations, low employment opportunities, etc.). **Sources and series**: see wid.world

Fig. 6. Women's Employment Rates, 1800-2025



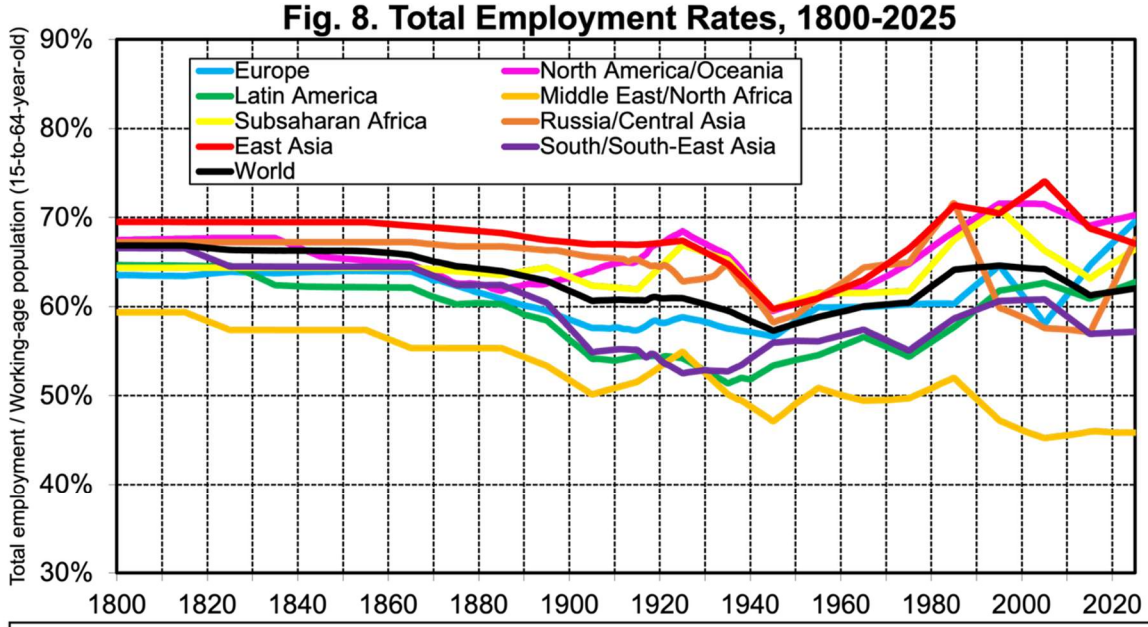
Interpretation. Women's employment rate, defined as the ratio between total female employment (irrespective of employment status or sector) and working-age female population (15-to-64-year-old), has followed a U-shaped curve at the global level over the 1800-2025 period, with important time and regional variations.
Sources and series: see wid.world

Fig. 7. Women's Relative Employment Rates, 1800-2025



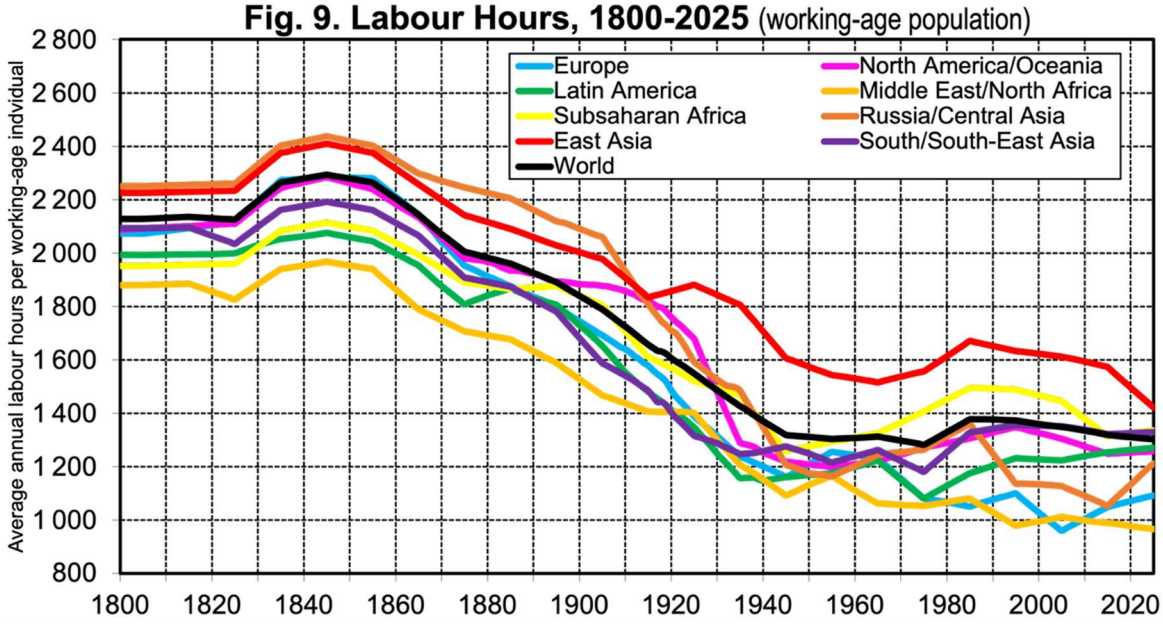
Interpretation. Women's relative employment rate, defined as the ratio between total women's and men's employment rates among the working-age female population (15-to-64-year-old), has followed a U-shaped curve at the global level over the 1800-2025 period, with important time and regional variations.
Sources and series: see wid.world

Fig. 8. Total Employment Rates, 1800-2025



Interpretation. The employment rate, defined as the ratio between total employment (irrespective of gender, employment status or sector) and working-age population (15-to-64-year-old), has been relatively stable around 60-65% at the global level over the 1800-2025 period, with interesting variations across regions and over time, reflecting in particular important variations in female employment.
Sources and series: see wid.world

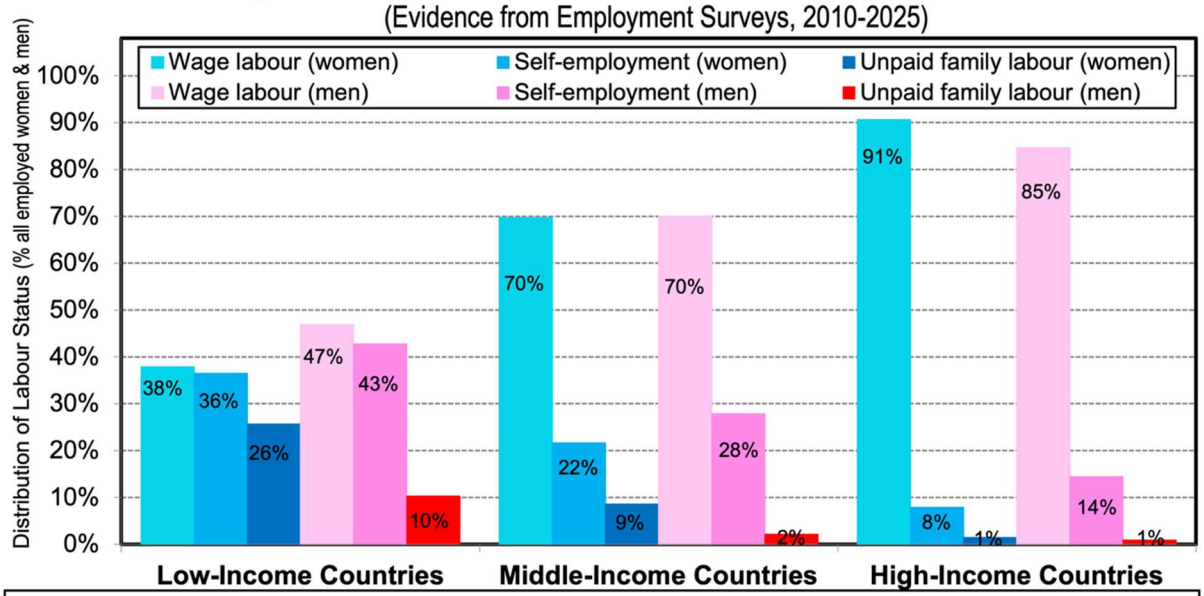
Fig. 9. Labour Hours, 1800-2025 (working-age population)



Interpretation. We observe a long-run decline in average economic labour hours per working-age individual (15-to-64-year-old) at the global level over the 1800-2025 period, with a stabilisation in recent decades due to rising female employment. **Sources and series**: see wid.world

Fig. 10. Labour Status & Gender in Poor & Rich Countries

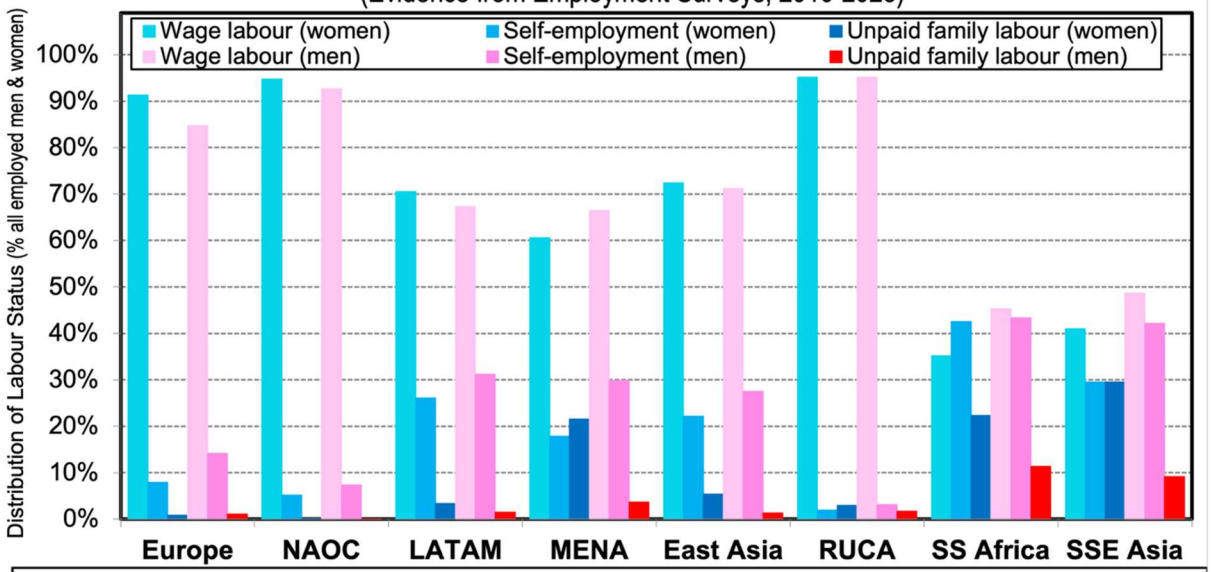
(Evidence from Employment Surveys, 2010-2025)



Interpretation. In poor countries (per capita NNI<10k € PPP 2023), 38% of all employed women are wage-earners, 36% are self-employed and 26% are unpaid family workers (in agriculture and other sectors); 47% of employed men are wage-earners, 43% are self-employed and 10% are unpaid family workers. Wage labour gradually becomes predominant in middle-income countries (btw 10k & 30k) and rich countries (over 30k), both for women and men. **Note.** Authors' computations using employment surveys from 35 countries. **Sources & series**: wid.world

Fig. 11. Labour Status & Gender Across Regions

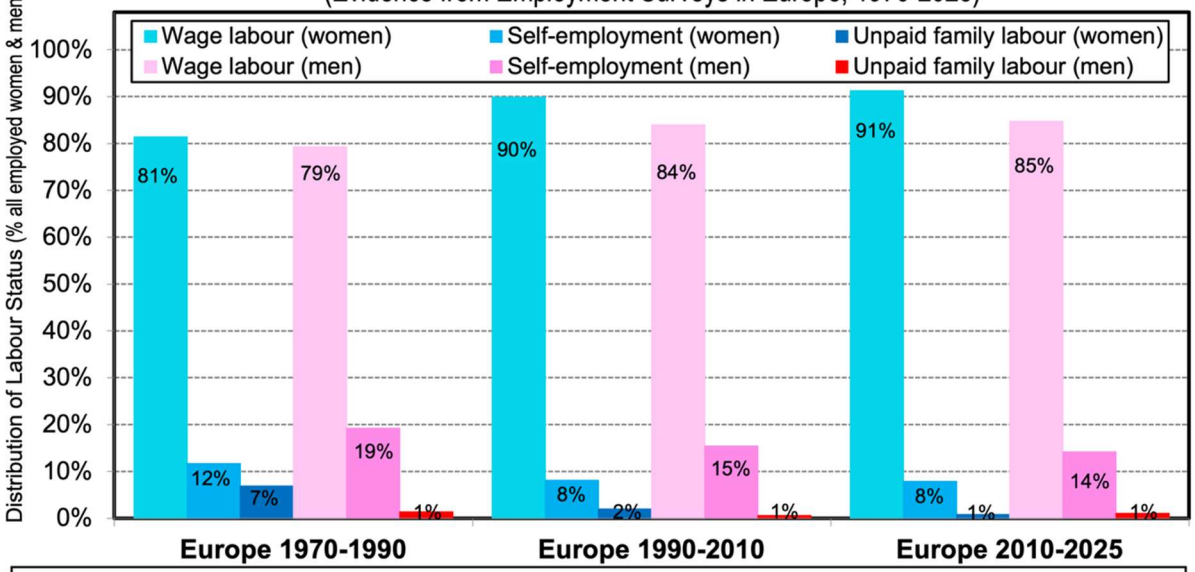
(Evidence from Employment Surveys, 2010-2025)



Interpretation. In 2010-2025, the proportion of unpaid family labour within employed women is particularly large in Middle East/North Africa (22%) Subsaharan Africa (22%) and South/South-East Asia (30%).
Note. Authors' computations using employment surveys from 35 countries. **Sources & series**: wid.world

Fig. 12. Labour Status & Gender over Time in Europe

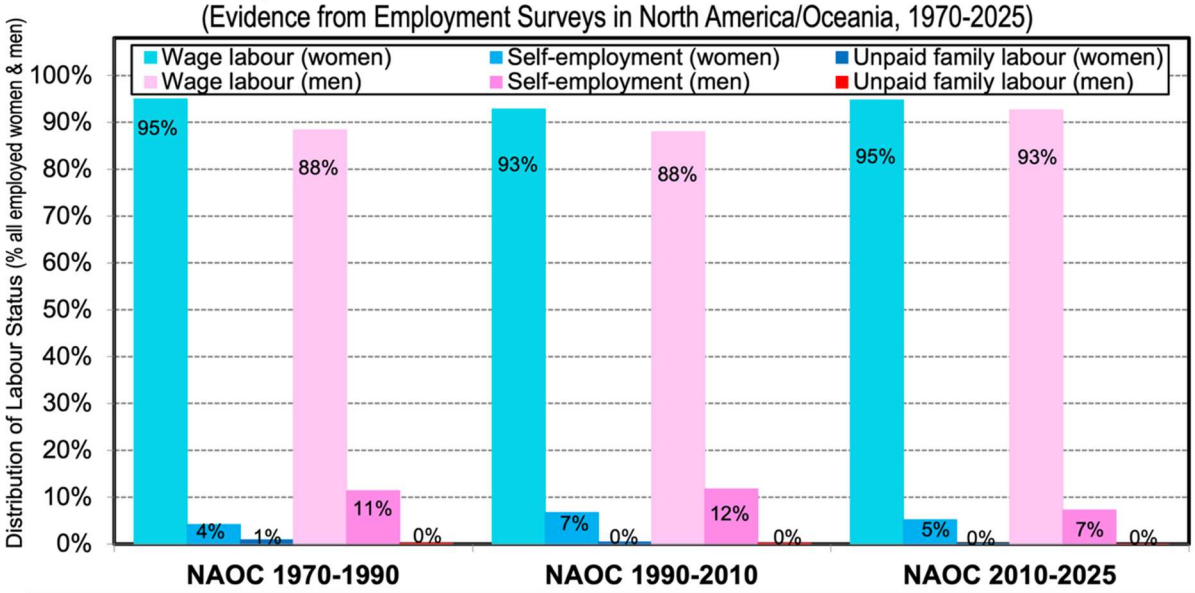
(Evidence from Employment Surveys in Europe, 1970-2025)



Interpretation. In 1970-1990, the proportion of unpaid family labour within employed women (7%) was comparable to middle-income countries in 2010-2025 (9%).
Note. Authors' computations using employmentsurveys run in Britain, Denmark, Italy, France, Germany and Spain over 1970-2025 period. **Sources & series**: wid.world

Fig. 13. Labour Status & Gender over Time in NAOC

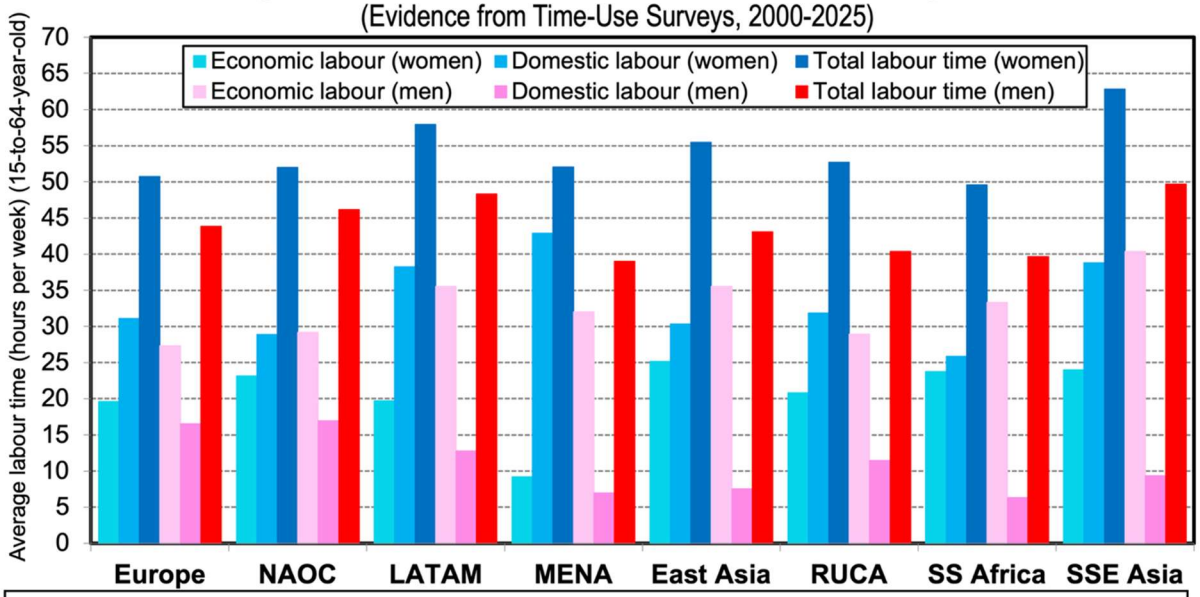
(Evidence from Employment Surveys in North America/Oceania, 1970-2025)



Interpretation. In 1970-1990, the proportion of unpaid family labour within employed women (1%) was already negligible in North America/Oceania, reflecting an early decline of the agricultural sector and other traditionnal familly self-employment activities.
Note. Authors' computations using employmentsurveys run in USA, Canada, Austrlalia and New Zealand over 1970-2025 period. **Sources & series**: wid.world

Fig. 14. Women Work More Than Men in All Regions

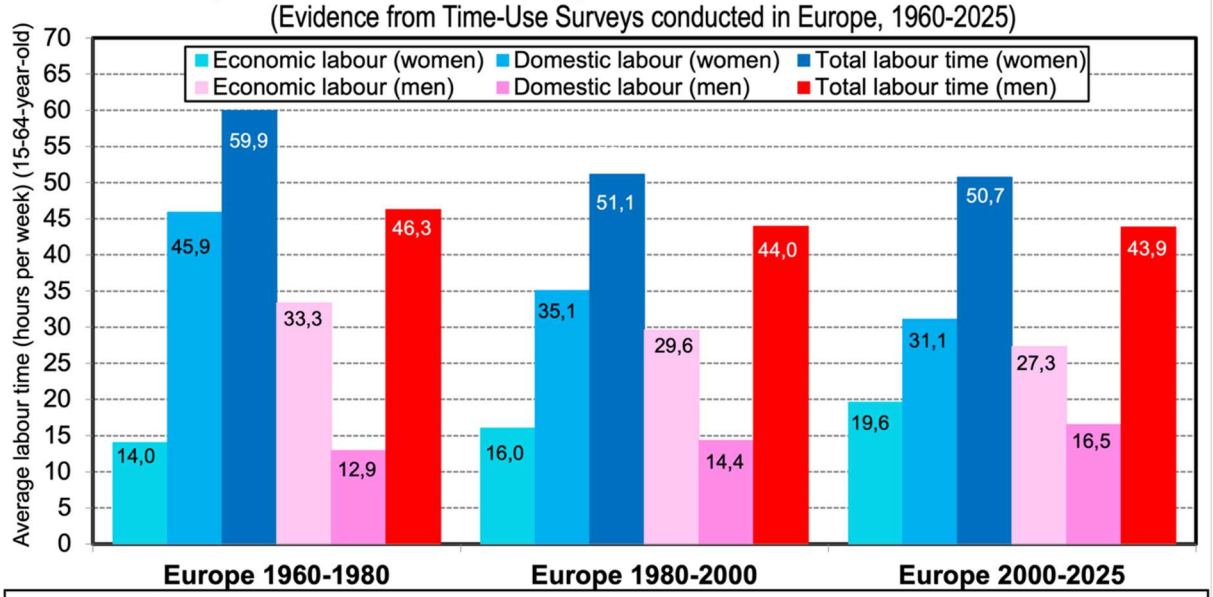
(Evidence from Time-Use Surveys, 2000-2025)



Interpretation. If we look at total labour time (economic + domestic), women work more men in all regions, with gaps ranging from 6-7 hours (Europe, North America/Oceania) to 12-13 hours (MENA, East Asia, South & South-East Asia). **Note.** Economic labour includes labour used to produce goods & services included in national accounts. Domestic labour includes all other forms of labour: household cleaning, cooking, child-care, etc. Authors' computations using time-use surveys run in 35 countries over 2000-2025 period. **Averages are computed over all individuals aged 15-to-64** (employed or not). **Sources & series**: wid.world

Fig. 15. Women Have Always Worked More Than Men: Europe

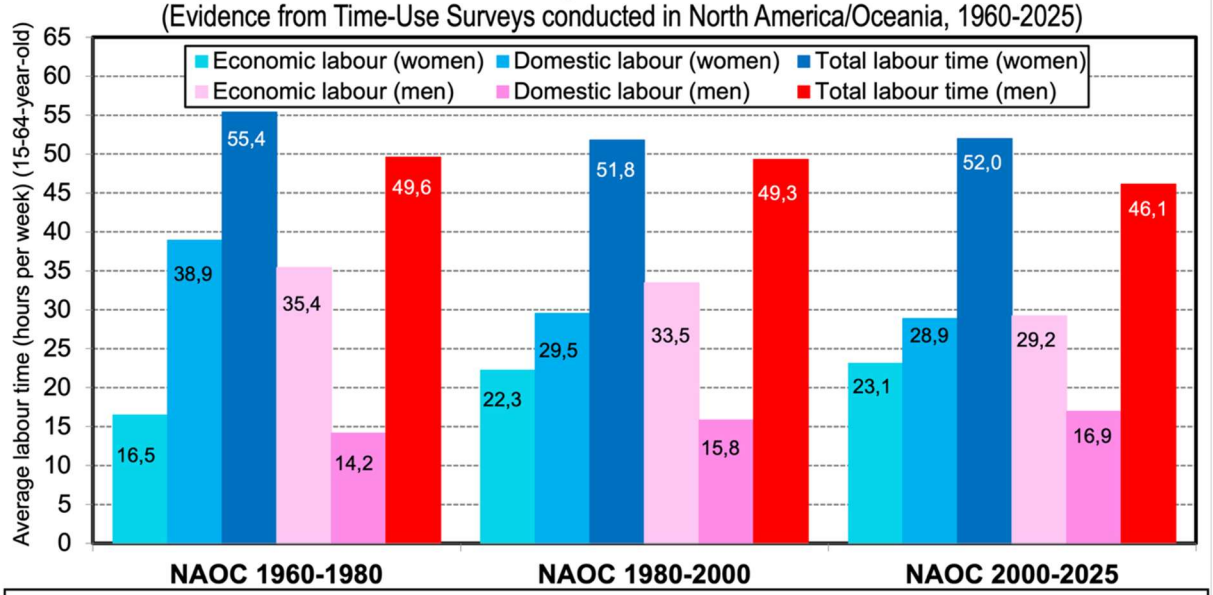
(Evidence from Time-Use Surveys conducted in Europe, 1960-2025)



Interpretation. If we look at total labour time (economic + domestic), we find that women have always worked more men in Europe. The reduction of gap observed in recent decades is relatively small. **Note.** Economic labour includes labour used to produce goods & services included in national accounts. Domestic labour includes all other forms of labour: household cleaning, cooking, child-care, etc. Authors' computations using time-use surveys run in Britain, Denmark, Italy, France, Germany and Spain over 1960-2025 period. **Averages are computed over all individuals aged 15-to-64** (employed or not). **Sources & series**: wid.world

Fig. 16. Women Have Always Worked More Than Men: NAOC

(Evidence from Time-Use Surveys conducted in North America/Oceania, 1960-2025)



Interpretation. If we look at total labour time (economic + domestic), we find that women have always worked more men in North America and Oceania, with no reduction of the gap in recent decades. **Note.** Economic labour includes labour used to produce goods & services included in national accounts. Domestic labour includes all other forms of labour: household cleaning, cooking, child-care, etc. Authors' computations using time-use surveys run in USA, Canada, Australia and New Zealand over 1960-2025 period. **Averages are computed over all individuals aged 15-to-64** (employed or not). **Sources & series**: wid.world

Table 3. Women Work Than Men: Summary Statistics

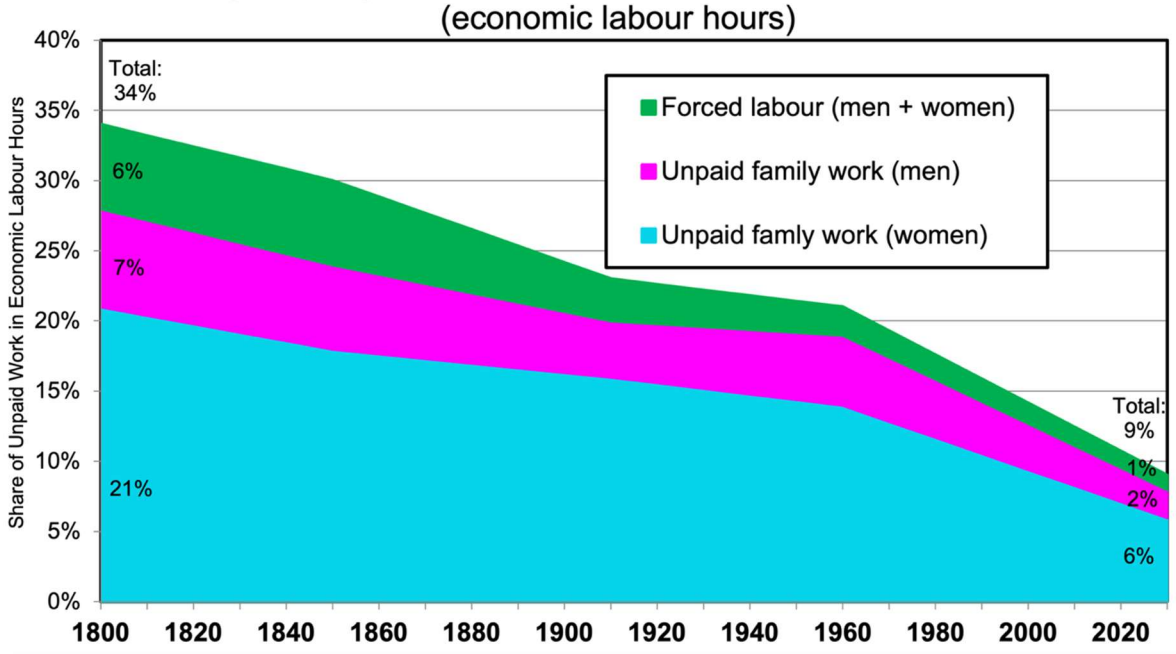
Average labour time (hours per week) among all working-age individuals (15-to-64-year-old) (working or not)	Women			Men			Gender gap in total labour time		Women share in labour time		
	Economic Labour	Domestic Labour	Total Labour Time	Economic Labour	Domestic Labour	Total Labour Time	Absolute (W-M)	Relative (W-M)/M	Economic Labour	Domestic Labour	Total Labour Time
Low-Income Countries	25,4	29,0	**54,4**	37,6	6,4	**44,0**	**10,4**	24%	40%	82%	**55%**
Middle-Income Countries	17,2	36,5	**53,7**	31,9	10,3	**42,2**	**11,4**	27%	35%	78%	**56%**
High-Income Countries	20,8	30,9	**51,7**	28,6	15,4	**44,0**	**7,7**	17%	42%	67%	**54%**
All Countries 2000-2025	21,1	32,1	**53,2**	32,7	10,7	**43,4**	**9,8**	23%	39%	75%	**55%**
Europe	19,6	31,1	**50,7**	27,3	16,5	**43,9**	**6,9**	16%	42%	65%	**54%**
North America/Oceania	23,1	28,9	**52,0**	29,2	16,9	**46,1**	**5,9**	13%	44%	63%	**53%**
Latin America	19,7	38,2	**57,9**	35,5	12,8	**48,3**	**9,6**	20%	36%	75%	**55%**
Middle East/North Africa	9,2	42,9	**52,1**	32,0	7,0	**39,0**	**13,0**	33%	22%	86%	**57%**
East Asia	25,2	30,3	**55,5**	35,5	7,5	**43,1**	**12,4**	29%	41%	80%	**56%**
Russia/Central Asia	20,8	31,9	**52,7**	28,9	11,5	**40,4**	**12,3**	30%	42%	74%	**57%**
Subsaharan Africa	23,8	25,9	**49,6**	33,3	6,3	**39,7**	**9,9**	25%	42%	80%	**56%**
South & Sout-East Asia	24,0	38,8	**62,8**	40,4	9,3	**49,7**	**13,1**	26%	37%	81%	**56%**
Europe 1960-1980	14,0	45,9	**59,9**	33,3	12,9	**46,3**	**13,7**	30%	30%	78%	**56%**
Europe 1980-2000	16,0	35,1	**51,1**	29,6	14,4	**44,0**	**7,2**	16%	35%	71%	**54%**
Europe 2000-2025	19,6	31,1	**50,7**	27,3	16,5	**43,9**	**6,9**	16%	42%	65%	**54%**
NAOC 1960-1980	16,5	38,9	**55,4**	35,4	14,2	**49,6**	**5,8**	12%	32%	73%	**53%**
NAOC 1980-2000	22,3	29,5	**51,8**	33,5	15,8	**49,3**	**2,5**	5%	40%	65%	**51%**
NAOC 2000-2025	23,1	28,9	**52,0**	29,2	16,9	**46,1**	**5,9**	13%	44%	63%	**53%**

Interpretation. If we look at total labour time (economic + domestic), women work more men in all categories of countries, particularly in low-income countries (per capita NNI<10k€ PPP 2023) & middle-income countries (btw 10k & 30k).

Note. Economic labour includes labour used to produce goods & services included in national accounts. Domestic labour includes all other forms of labour: household cleaning, cooking, child-care, etc. Authors' computations using time-use surveys run in 35 countries over 2000-2025 period.

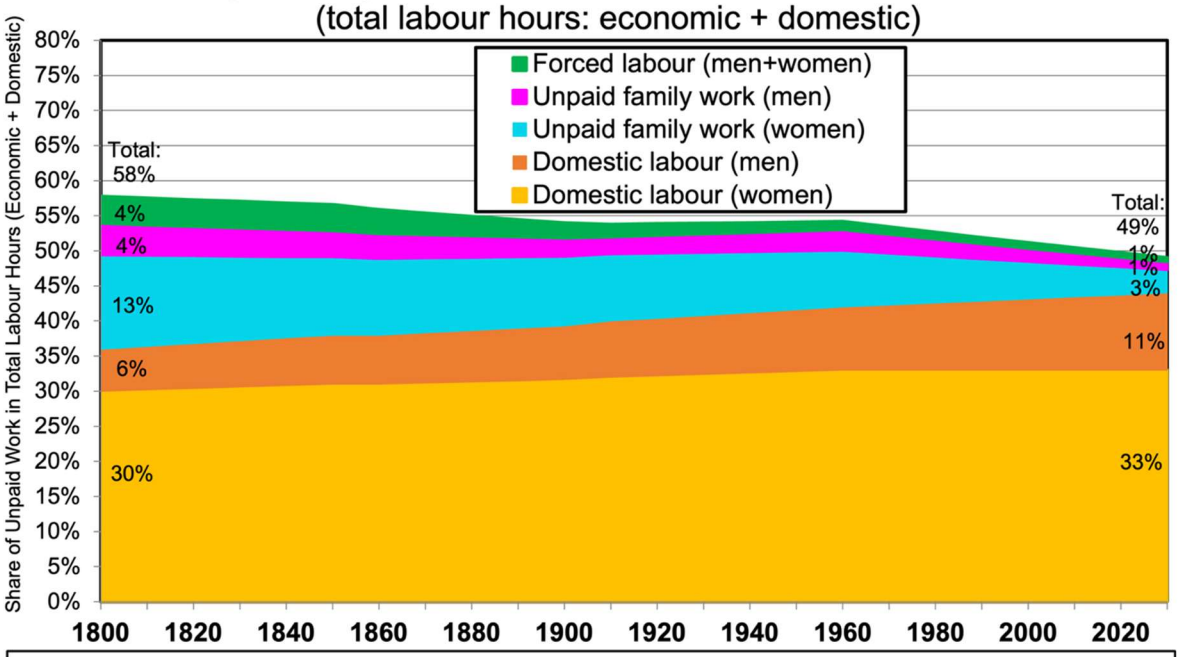
Sources & series: wid.world

Fig. 17. Unpaid Work: A Global Assessment 1800-2025
(economic labour hours)



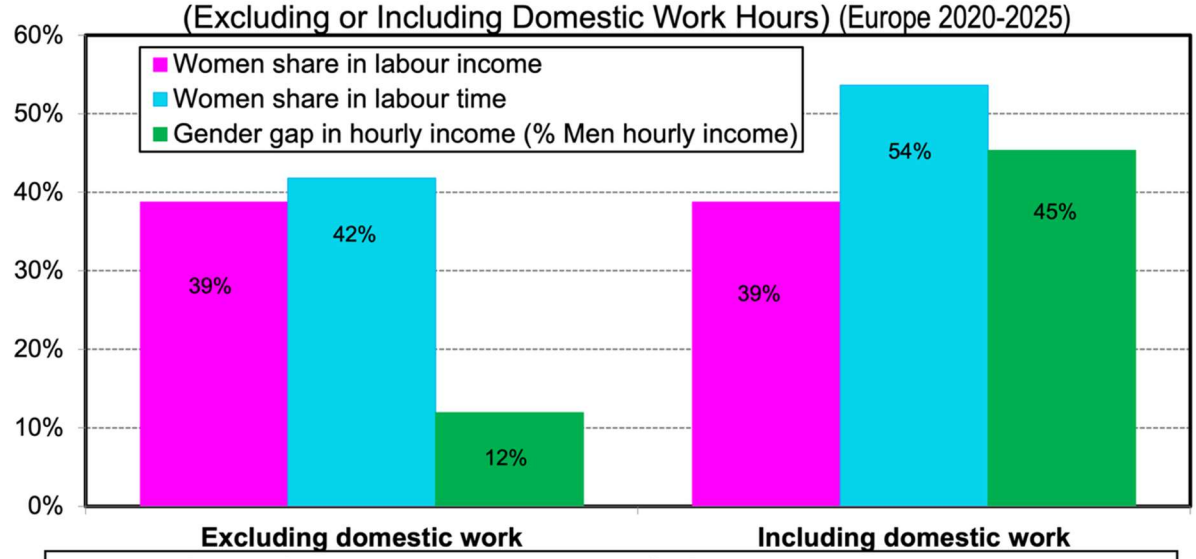
Interpretation. In 1800, the share of unpaid work in economic labour hours can be estimated to be around 34%, including about 21% for women's unpaid family work, 7% of men's unpaid family work and 6% for forced labour (including slave labour, serfdom and corvée labour). In 2025, the share of unpaid work makes about 9% of total economic labour hours. **Sources and series**: wid.world

Fig. 18. Unpaid Work: A Global Assessment 1800-2025
(total labour hours: economic + domestic)



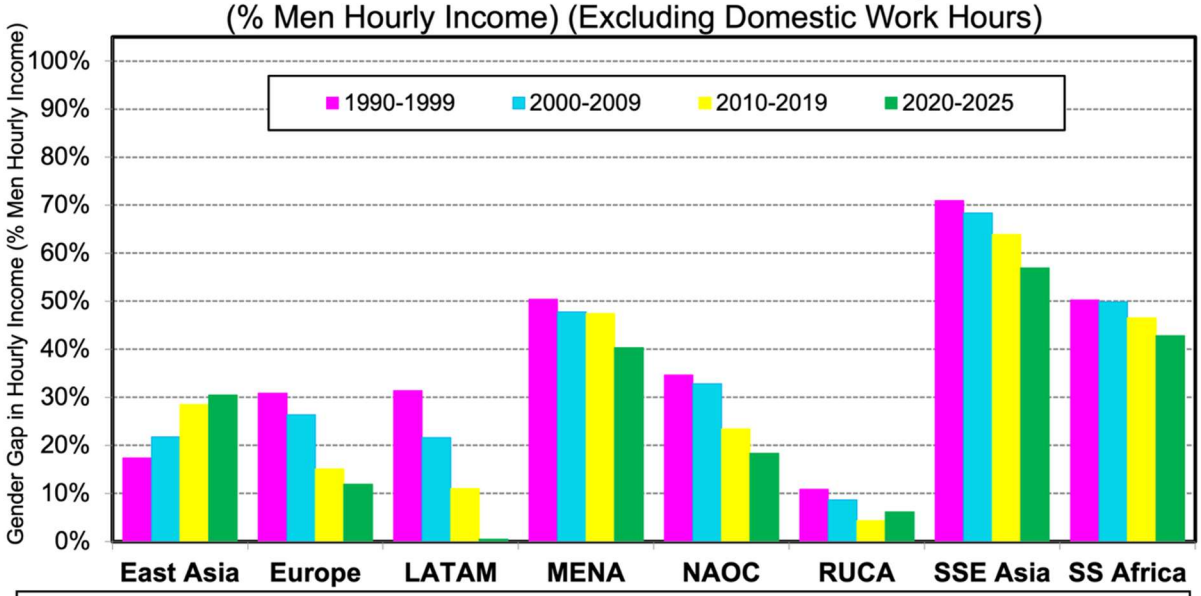
Interpretation. In 1800, the share of unpaid work in total labour hours (economic + domestic) can be estimated to be around 58%, as compared to 49% in 2025. In the long run, the decline in unpaid family work and forced labour has been partly compensated by the rise of the share of domestic labour in total labour hours. **Sources and series**: wid.world

Fig. 19. Alternative Measures of the Gender Gap
(Excluding or Including Domestic Work Hours) (Europe 2020-2025)



Interpretation. The share of women in total labour income is equal to 39% in Europe in 2020-2025, while heir share in economic work hours is equal to 42%. This implies that their average income per work hour (excluding domestic work hours) is 12% smaller than that of men. However their share in total work hours (including domestic work) is equal to 54%. This implies that their average labour income per work hour (including both economic and domestic work hours) is 45% smaller than that of men. The bottom line is that the inclusion of domestic labour has a major impact on the measured gender gap. **Note.** If women shares in labour income and labour time are equal to i and t, then the gender gap in hourly income (as a % of average men hourly income) is given by the following formula: g=(t-i)/(t(1-i)). **Sources & series**: wid.world

Fig. 20. The Conventional Gender Gap in Hourly Income
(% Men Hourly Income) (Excluding Domestic Work Hours)



Interpretation. Average women labour income per work hour (excluding domestic work hours) was 31% smaller than that average men labour income per work hour in Europe in 1990-1999, and it is 12% smaller in 2020-2025. Generally speaking, the gender gap looks relatively moderate (10-20% or less) in a number of world regions when we exclude domestic work hours. **Sources & series**: wid.world

Fig. 21. The Extended Gender Gap in Hourly Income
(% Men Hourly Income) (Including Domestic Work Hours)

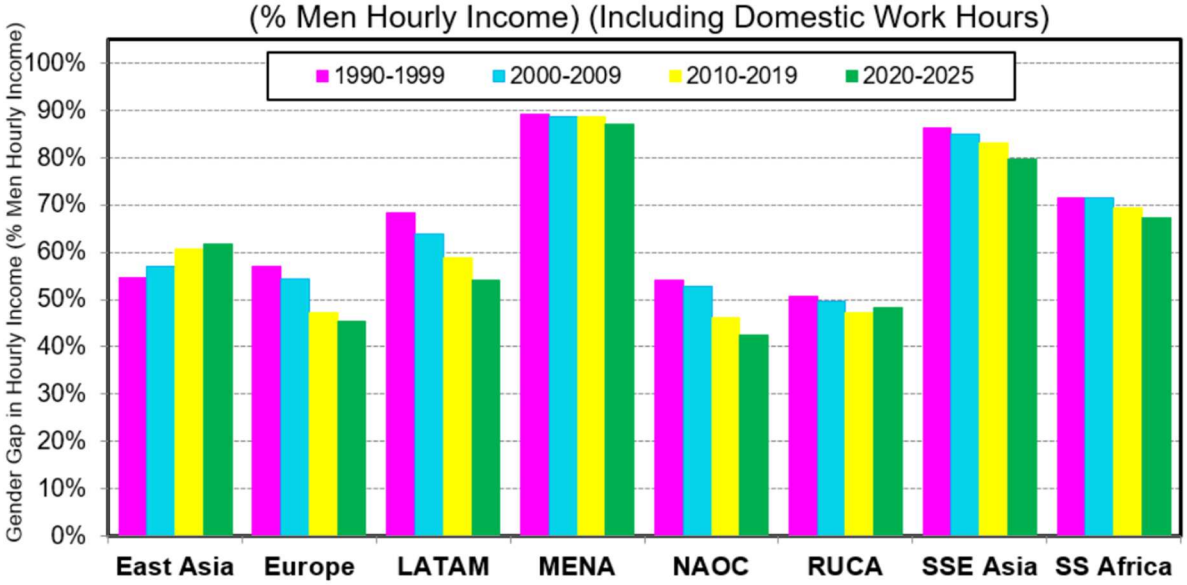
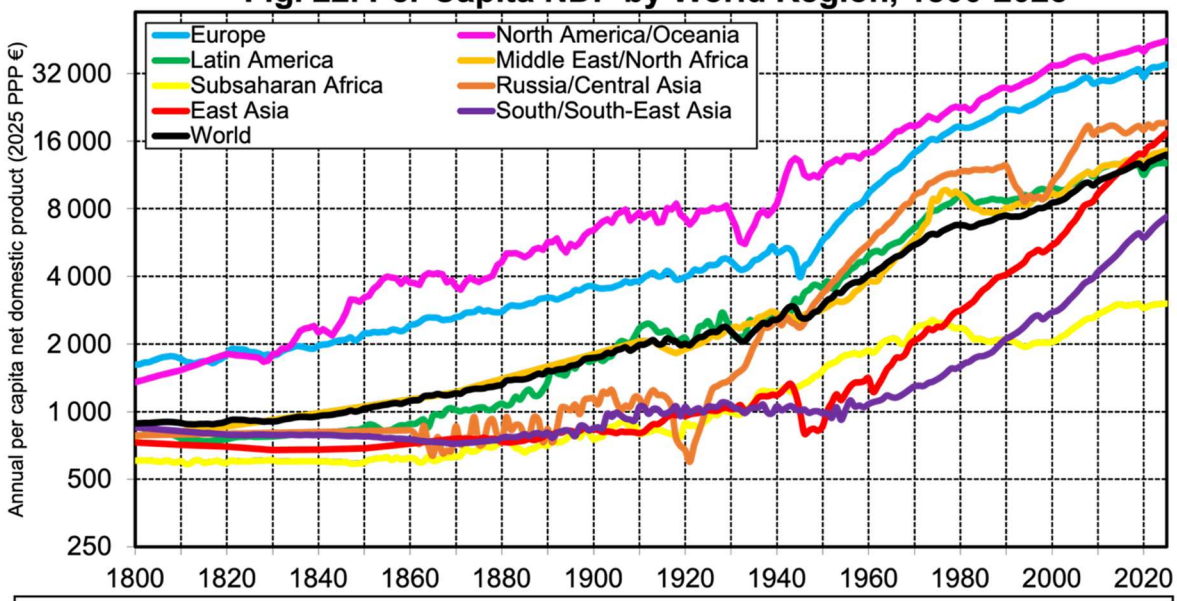
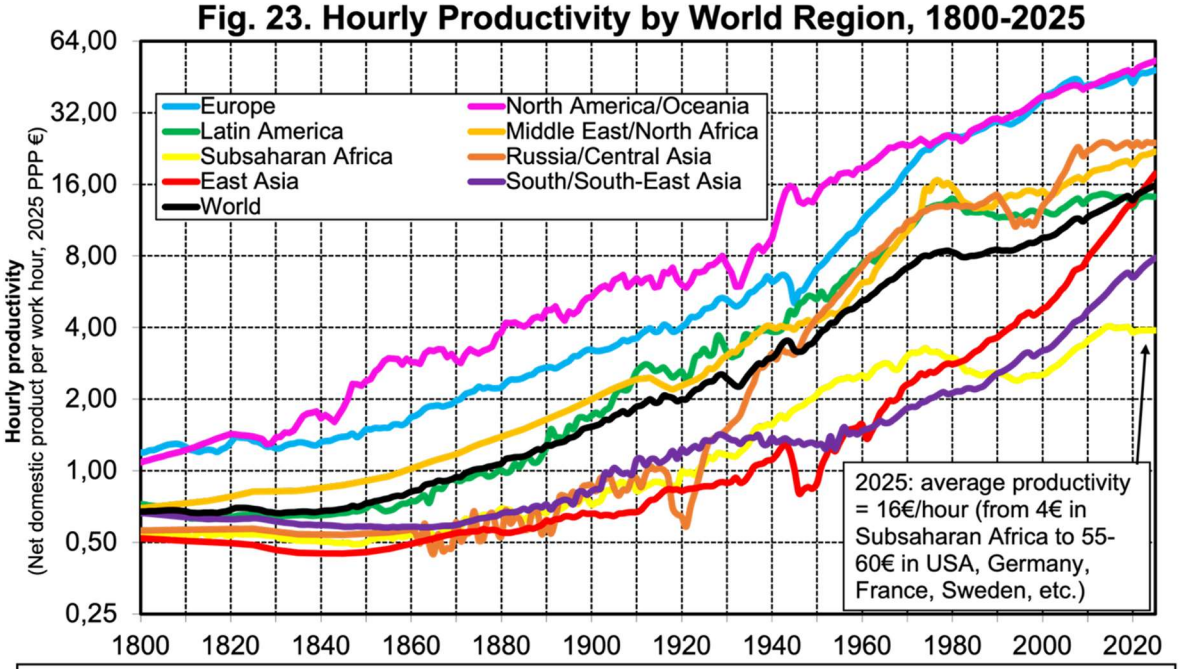


Fig. 22. Per Capita NDP by World Region, 1800-2025



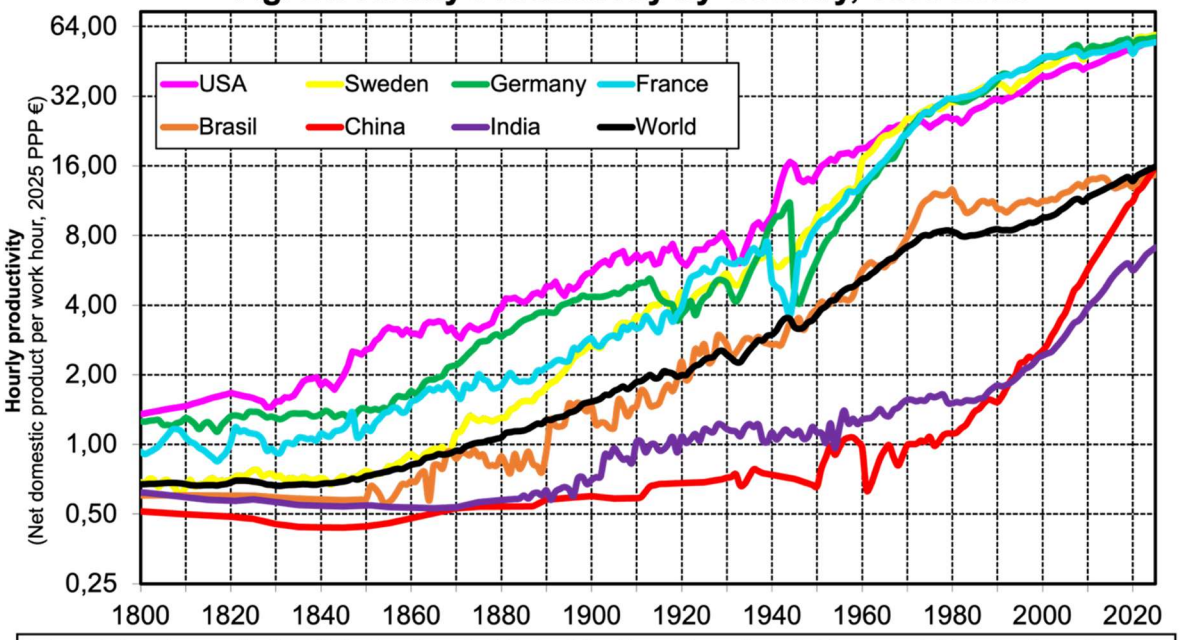
Interpretation. Expressed in 2025 PPP €, annual per capita net domestic product (NDP) rose from about 900€ in 1800 to 14 000€ in 2025 at the global level. I.e. it was multiplied by about 16, which corresponds to average annual real growth rate of 1,2% per year, with large variations over time and across regions. **Sources and series**: see wid.world

Fig. 23. Hourly Productivity by World Region, 1800-2025



Interpretation. Expressed in 2025 PPP €, hourly productivity (as defined by net domestic product by economic labour hour) rose from about 0.7€ in 1800 to 16€ in 2025 at the global level. I.e. it was multiplied by about 24, which corresponds to average annual real growth rate of 1,4% per year, with large variations over time and across regions. **Sources and series**: see wid.world

Fig. 24. Hourly Productivity by Country, 1800-2025



Interpretation. Expressed in 2025 PPP €, hourly productivity (as defined by net domestic product by economic labour hour) rose from about 0.7€ in 1800 to 16€ in 2025 at the global level. I.e. it was multiplied by about 24, which corresponds to average annual real growth rate of 1,4% per year, with large variations over time and across regions. **Sources and series**: see wid.world

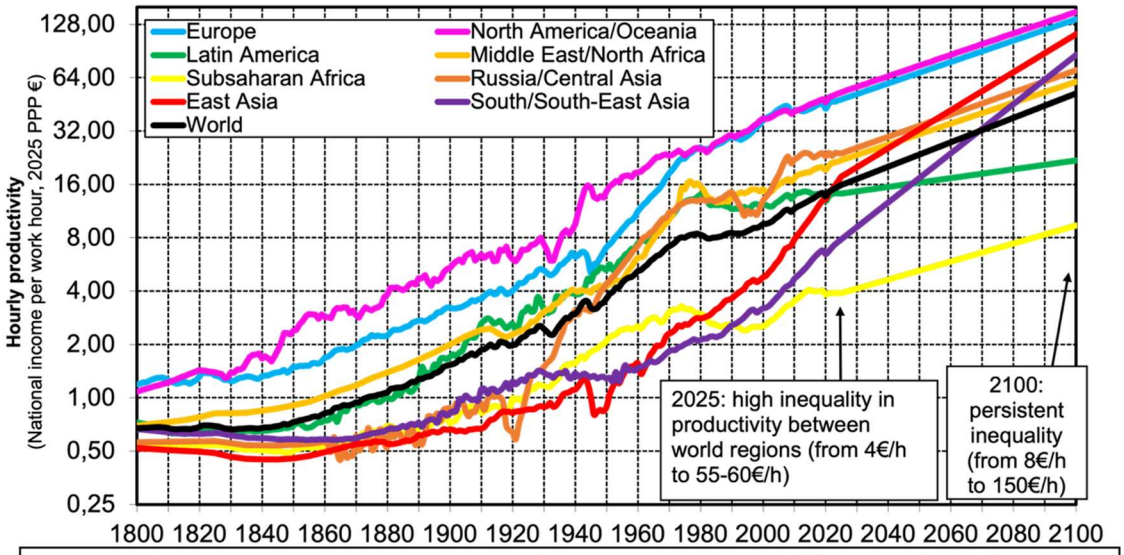
Table 4. Productivity Growth by World Regions (1800-2025)					
Annual real growth rate of productivity (hourly NDP)	1800-2025	1800-1910	1910-1950	1950-1990	1990-2025
East Asia	1,6%	0,2%	0,7%	3,6%	**4,6%**
Europe	1,7%	1,0%	1,7%	3,6%	**1,4%**
Latin America	1,3%	1,2%	1,8%	2,0%	**0,6%**
Middle East/ North Africa	1,5%	1,1%	1,4%	2,9%	**1,4%**
North America/ Oceania	1,7%	1,6%	2,1%	1,8%	**1,6%**
Russia/ Central Asia	1,7%	0,5%	4,0%	3,0%	**1,5%**
South/South-East Asia	1,1%	0,5%	0,4%	1,7%	**3,2%**
Sub Saharan Africa	0,9%	0,4%	2,4%	0,5%	**1,2%**
World	**1,4%**	**0,9%**	**1,7%**	**2,2%**	**1,8%**

Interpretation. Productivity (as defined by net domestic product per hour of economic labour) has been multiplied by about 24 at the global level between 1800 and 2025 (from about 0.7€/h in 1800 to about 16€/h in 2025) (PPP 2025 €). This corresponds to an average annual real growth rate of 1.4%. Productivity growth has increased from 0.9% over the 1800-1910 period to 1.7% over 1910-1950 and 2.2% and 1.8% over 1950-1990 and 1990-2025.
Sources and series: wid.world

Table 5. The Elasticity of Labour Hours With Respect to Productivity						
	Average Annual Labour Hours per Employed Individual (log)			Average Annual Labour Hours per Working-Age Individual (15-64) (log)		
Hourly Productivity (log)	-0.128***	-0.176***	-0.082***	-0.145***	-0.192***	-0.116***
(s.e.)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.005)
Country Fixed Effects	NO	YES	YES	NO	YES	YES
Period Covered	1800-2025	1800-2025	1980-2025	1800-2025	1800-2025	1980-2025
R2	0,59	0,80	0,76	0,55	0,75	0,73
N.obs	12882	12882	2622	12882	12882	2622

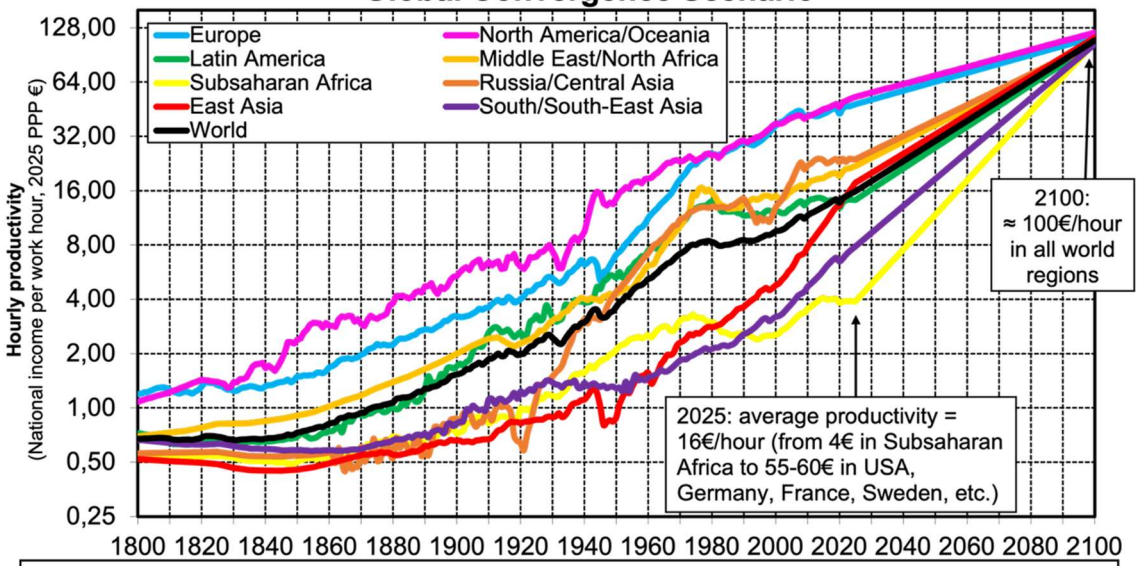
Interpretation. When hourly productivity increases by 1%, labour hours decline by 0.13% (specification without country fixed effects) or by 0.18% (specification with country fixed effects). The estimated coefficients are smaller if we restrict to the post-1980 and do not use the full historical variations.

Fig. 25. World Productivity Trends 2025-2100: Business-As-Usual Scenario



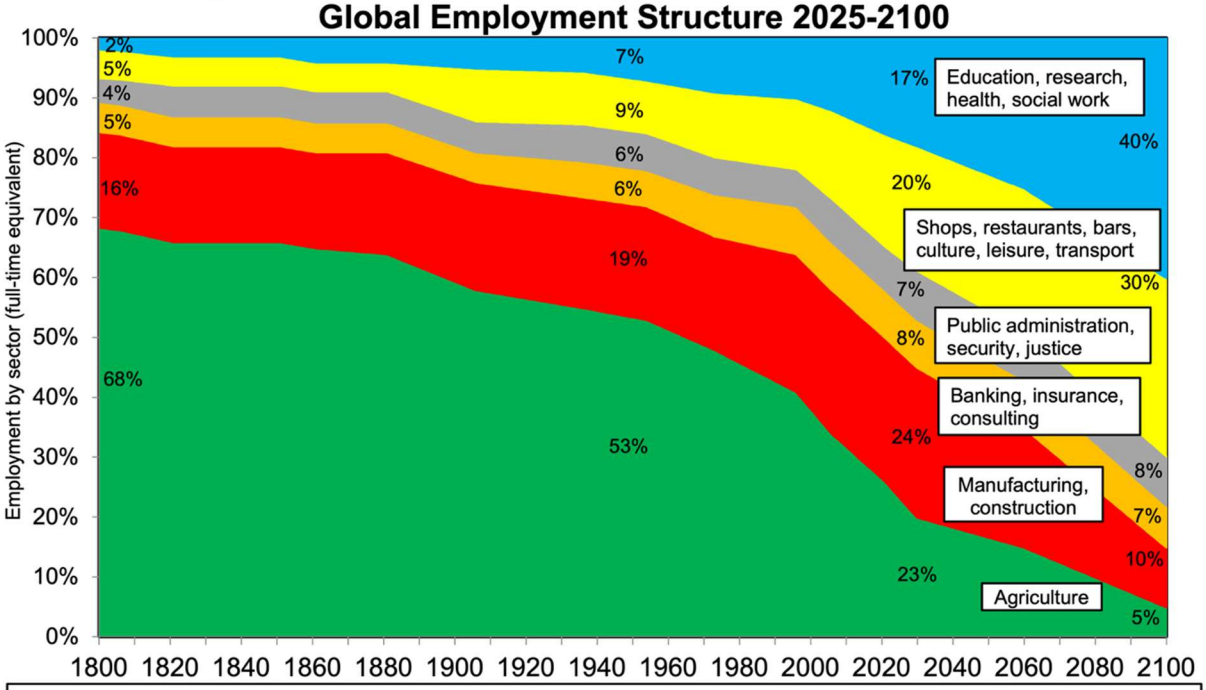
Interpretation. Under the "business-as-usual" scenario (same productivity growth rates as in 1900-2025, with minor changes), inequality in hourly productivity is projected to remain very high between world regions by 2100. In particular, productivity in 2100 would be only 9€/hour in Subsaharan Africa (with a population reaching 3.3b in 2100, vs 1.3b in 2025 according to UN central scenario). **Sources and series**: see wid.world

Fig. 26. World Productivity Trends 2025-2100: Global Convergence Scenario



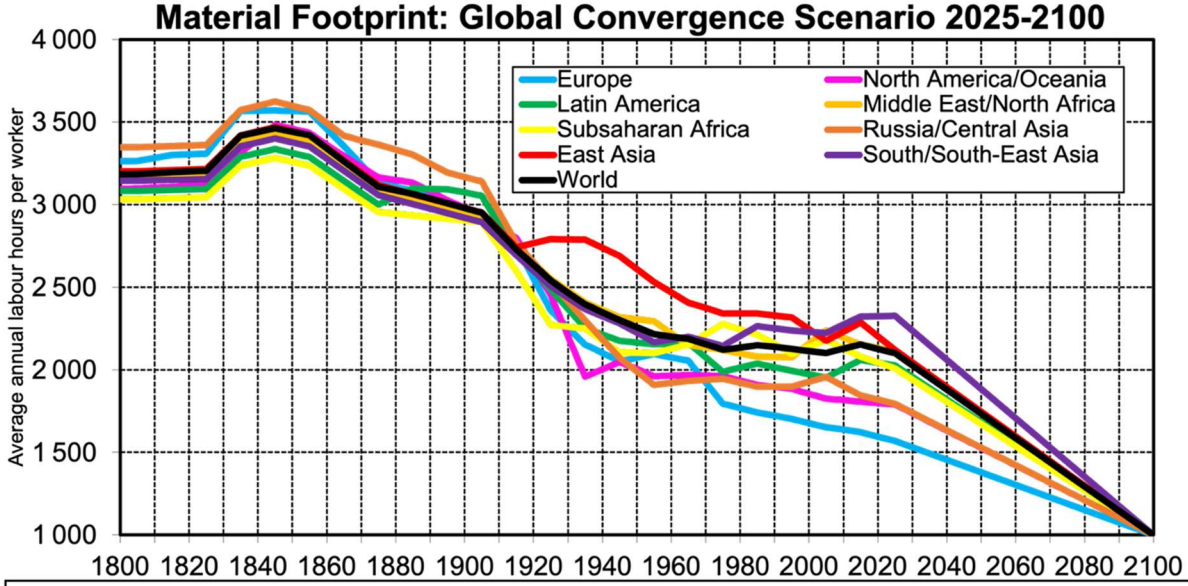
Interpretation. Under the "global convergence" scenario, productivity growth rates are assumed to be such that all regions converge to about 100-120€/hour by 2100. This requires in particular a large acceleration of productivity growth in Subsaharan Africa (4.5% per year over 2025-2100 period, i.e. about the same as in East Asia 1990-2025). **Sources and series**: see wid.world

Fig. 27. Planetary Habitability & Structural Transformation: Global Employment Structure 2025-2100



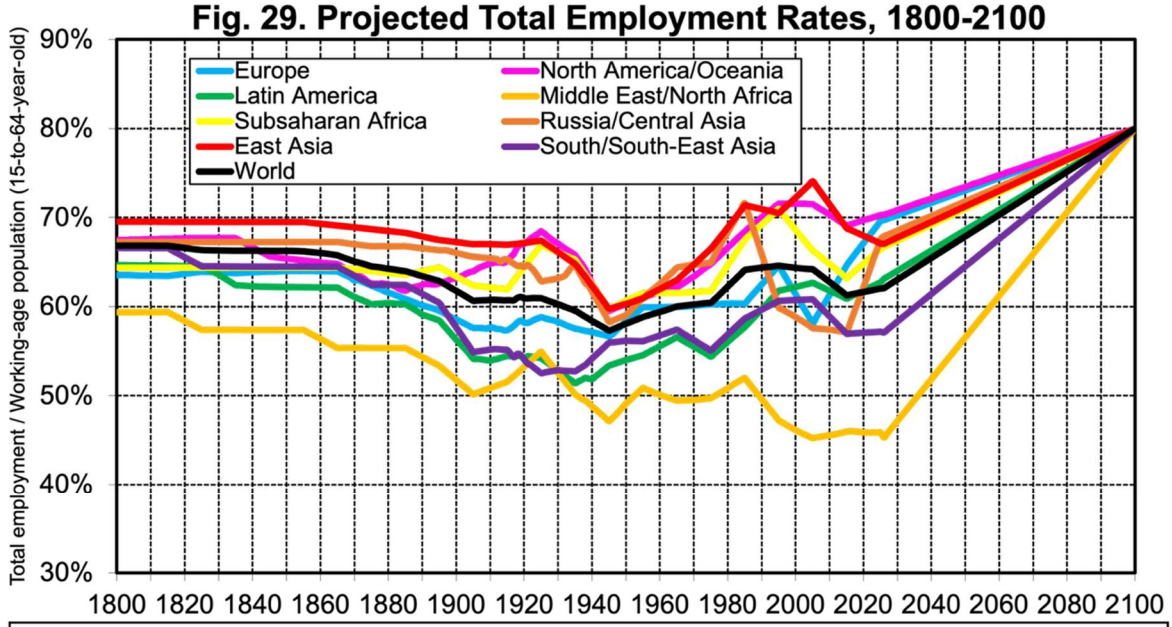
Interpretation. At the world level, the share of agriculture (including agri-food industry) in total employment dropped from 68% in 1800 to 53% in 1950 and 23% in 2025, and could further drop to about 5% by 2100. **Sources and series** : see wid.world

Fig. 28. Using Productivity Gains to Reduce Work Hours & Material Footprint: Global Convergence Scenario 2025-2100



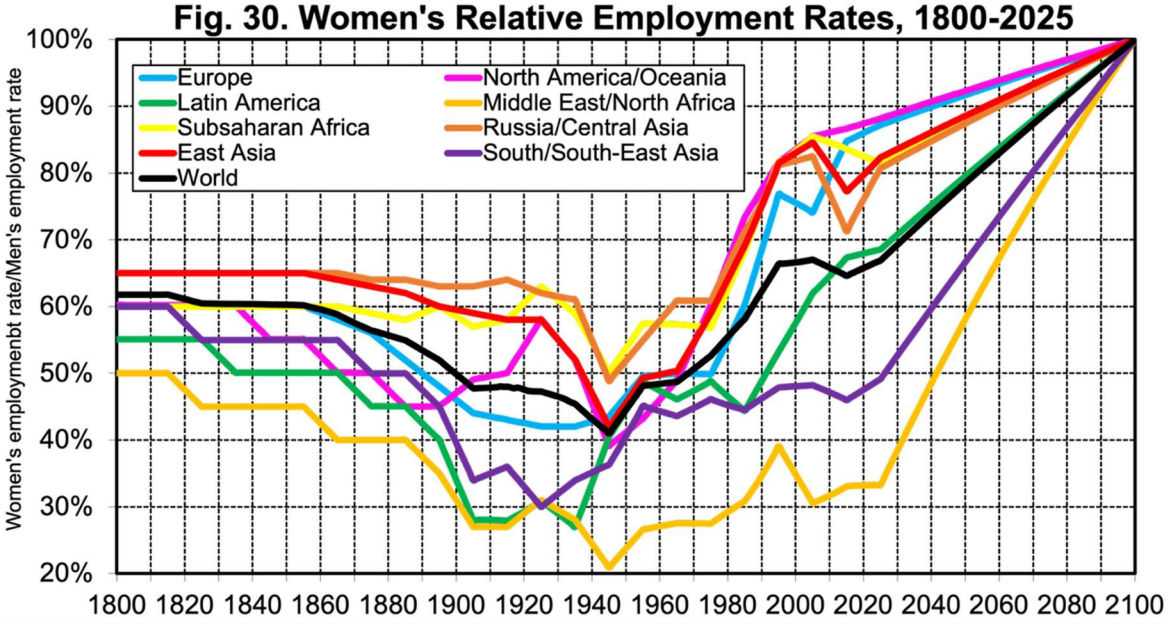
Interpretation. According to the global convergence scenario, annual labour hours per work should decline around 1250 hours per worker in all world regions around 2100. Note. Annual labour hours around 3000-3500 hours correspond to about 60-65 hours per week all year long. Annual hours around 2000 hours correspond to 40 hours per week during 50 weeks (2 weeks in paid vacation); annual hours around 1600 hours correspond to 35 hours per week during 47 weeks (5 weeks in paid vacation); annual hours around 1000 hours correspond to 25 hours per week during 40 weeks (12 weeks in paid vacation). **Sources and series**: see wid.world

Fig. 29. Projected Total Employment Rates, 1800-2100



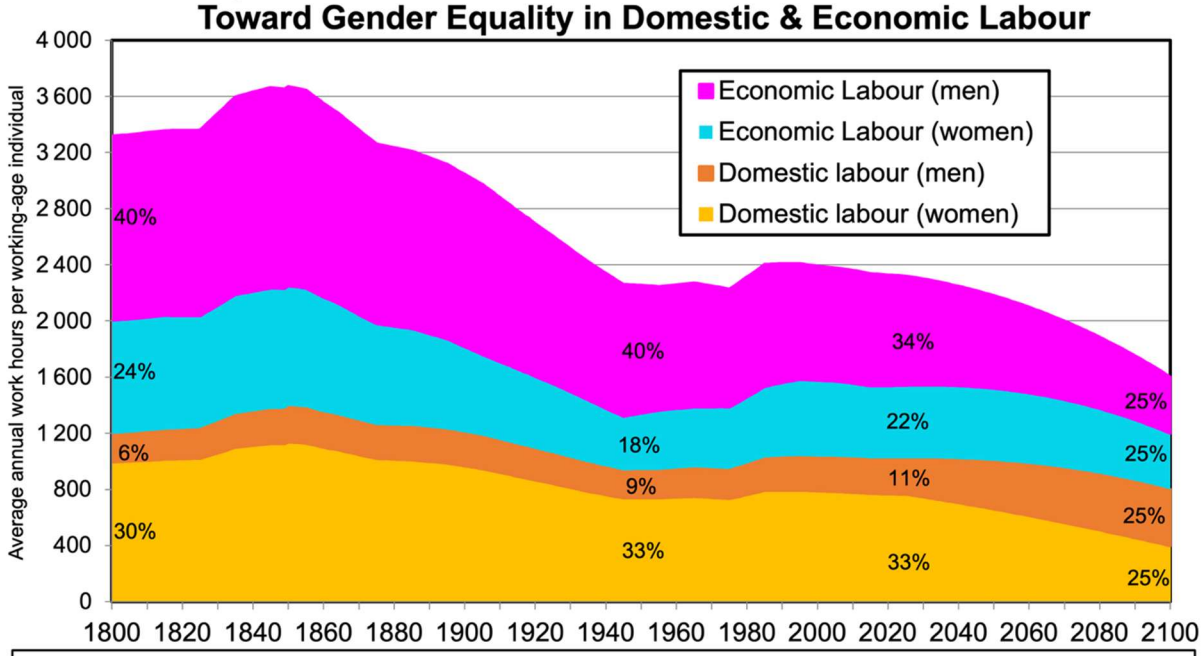
Interpretation. In the global convergence the scenario, the employment rate, defined as the ratio between total employment (irrespective of employment status or sector) and working-age population (15-to-64-year-old), is expected to converge toward 80% in all world regions by 2100, both for men and women.
Sources and series: see wid.world

Fig. 30. Women's Relative Employment Rates, 1800-2025



Interpretation. In the global convergence the scenario, the employment rate, defined as the ratio between total employment (irrespective of employment status or sector) and working-age population (15-to-64-year-old), is expected to converge toward 80% in all world regions by 2100, both for men and women, so that the relative women/men employment rate converges toward 100% everywhere.
Sources and series: see wid.world

Fig. 31. The Structual Transformation of Work 1800-2100: Toward Gender Equality in Domestic & Economic Labour



Interpretation. In the global convergence scenario, working-age men and women are projected to supply the same quantity of economic labour and domestic labour and to receive equal average pay. This would represent a continuation of the trend toward gender equality observed between 1950 and 2025, albeit with a major acceleration. **Sources and series**: wid.world

Table 6. Projections for Productivity Growth (2025-2100)

	Productivity 2025 (hourly NDP) (PPP € 2025)	Business-as-Usual Scenario		Global Convergence Scenario	
		Productivity growth rate 2025-2100	Productivity 2100 (PPP € 2025)	Productivity growth rate 2025-2100	Productivity 2100 (PPP € 2025)
East Asia	**17,7**	2,5%	**112,8**	2,5%	**112,8**
Europe	**48,2**	1,4%	**136,8**	1,2%	**113,7**
Latin America	**14,2**	0,6%	**21,8**	2,7%	**104,7**
Middle East/ North Africa	**21,9**	1,4%	**60,7**	2,1%	**104,1**
North America/ Oceania	**52,9**	1,4%	**150,1**	1,1%	**120,2**
Russia/ Central Asia	**23,9**	1,5%	**70,4**	2,0%	**105,5**
South/South-East Asia	**7,8**	3,2%	**86,2**	3,5%	**103,6**
Sub Saharan Africa	**3,9**	1,2%	**9,4**	4,5%	**105,7**
World	**15,8**	**1,6%**	**52,1**	**2,6%**	**108,5**

Interpretation. In the "business-as-usual" scenario, productivity growth in 2025-2100 is the same as in 1900-2025 (except in East Asia, where it is assumed to drop from 4.4% to 2.5% as the region catches up with the world productivity frontier, and in Europe/NAOC, where it is assumed to drop from 1.6-1.7% to 1.4%). In the "global convergence" scenario, productivity growth rates are assumed to be such that all regions converge to about 100-120€ in hourly productivity by 2100. This requires in particular a large acceleration of productivity growth in Subsaharan Africa, thanks to massive investment in human capital and infrastructures.
Sources and series: wid.world

Table 7. Using Productivity Gains to Reduce Work Time & Material Footprint

Global Convergence Scenario: 1000h worktime in 2100 (25h x 40w)					
	Productivity 2025 (hourly NDP) (PPP € 2025)	Living Standards 2025 (per capita NDP) (PPP € 2025)	Productivity 2100 (hourly NDP) (PPP € 2025)	Living Standards 2100 (per capita NDP) (PPP € 2025)	**Share of Productivity Gains Devoted to Extra Leisure** (vs Extra Production)
East Asia	17,7	17 423	112,8	54 138	51%
Europe	48,2	35 031	113,7	54 568	34%
Latin America	14,2	12 793	104,7	50 273	47%
Middle East/ North Africa	21,9	14 511	104,1	49 984	28%
North America/ Oceania	52,9	44 755	120,2	57 690	43%
Russia/ Central Asia	23,9	19 276	105,5	50 643	41%
South/South-East Asia	7,8	7 373	103,6	49 713	49%
Sub Saharan Africa	3,9	3 024	105,7	50 757	38%
World	**15,8**	**13 931**	**108,5**	**52 088**	**45%**

Interpretation. According to the "global convergence" scenario, 45% of productivity gains will be devoted to extra leisure (as opposed to extra production) at the global level over the 2025-2100 period.
Note. Computations are made under the assumption that employment ratio converges to 80% for working-age men and women in 2100 and that fraction of working-age population in total population is equal to 60% in 2100.
Sources and series: wid.world

Table 8. Using Productivity Gains to Reduce Work Time & Material Footprint Less Ambitious Scenario: 1260h worktime 2100 (30h x 42w)					
	Productivity 2025 (hourly NDP) (PPP € 2025)	Living Standards 2025 (per capita NDP) (PPP € 2025)	Productivity 2100 (hourly NDP) (PPP € 2025)	Living Standards 2025 (per capita NDP) (PPP € 2025)	**Share of Productivity Gains Devoted to Extra Leisure** (vs Extra Production)
East Asia	17,7	17 423	112,8	68 214	39%
Europe	48,2	35 031	113,7	68 756	17%
Latin America	14,2	12 793	104,7	63 344	33%
Middle East/North Africa	21,9	14 511	104,1	62 980	9%
North America/ Oceania	52,9	44 755	120,2	72 689	29%
Russia/ Central Asia	23,9	19 276	105,5	63 810	25%
South/South-East Asia	7,8	7 373	103,6	62 639	36%
Sub Saharan Africa	3,9	3 024	105,7	63 954	22%
World	**15,8**	**13 931**	**108,5**	**65 631**	**31%**

Interpretation. According to the less ambitious scenario, 31% of productivity gains will be devoted to extra leisure (as opposed to extra production) at the global level over the 2025-2100 period.
Note. Computations are made under the assumption that employment ratio converges to 80% for working-age men and women in 2100 and that fraction of working-age population in total population is equal to 60% in 2100.
Sources and series: wid.world

Table 9. Using Productivity Gains to Reduce Work Time: Lessons from the Past and Scenarios for the Future	
	Share of Productivity Gains Devoted to Extra Leisure (vs Extra Production)
1800-2025	**33%**
incl. 1800-1860	-4%
incl. 1860-1980	41%

incl. 1980-2025	-8%
Global Convergence Scenario 2025-2100 (Target 2100: 1000h = 25h/w x 40w)	**45%**
Less Ambitious Scenario 2025-2100 (Target 2100: 1260h = 30h/w x 42w)	**31%**
Interpretation. According to the "global convergence" scenario, 45% of productivity gains will be devoted to extra leisure (as opposed to extra production) at the global level over the 2025-2100 period. This is roughly in line with the historical record observed during the 1860-1980 period (slightly more ambitious). **Sources and series**: wid.world	