Global Working Hours

Amory Gethin and Emmanuel Saez*

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Abstract

This paper uses labor force surveys from 157 countries to build a new microdatabase on hours worked covering 97% of the world population in cross section. We also construct time series spanning over three decades in 79 countries. Hours worked per adult are slightly bell-shaped with GDP per capita but weakly correlated with development overall. Hours worked by the young (aged 15-19) and elderly (aged 60+) decline with development, driven by growing school attendance and public pension coverage. Hours worked among prime-age adults (aged 20-59) are mildly bell-shaped with development for men while they are increasing for women. The fall in male hours in middle-to-higher income countries is driven by reduced hours per worker and is offset by increases in female labor force participation. These two forces have exactly compensated each other in many countries, leading to a remarkable long-run stability of prime-age hours worked. Labor taxes—but not consumption taxes—are strongly negatively correlated with hours worked both in international comparisons and overtime within countries. Controlling for government transfers only partly reduces the link between labor taxes and hours, ruling out substitution and income effects on labor supply as the key driver. Controlling for working hours regulations and the size of the formal sector almost entirely eliminates this link, suggesting that they explain the low levels of work hours observed in high-income countries.

*Gethin: World Bank (email: agethin@worldbank.org); Saez: University of California Berkeley, Department of Economics (email: esaez@berkeley.edu). We thank David Lagakos, Louise Paul-Delvaux, Thomas Piketty, Benjamin Schoefer, and numerous conference and seminar participants for helpful discussions and comments. Clotaire Boyer provided research assistance. We also thank the International Labour Organization for giving us access to data tabulations from their collection of harmonized household surveys; we are especially thankful to David Bescond for his help and assistance throughout. We are also grateful to Mario Gronert for his advice and help in accessing and exploiting the World Bank Global Labor Database, as well as to the World Bank Data Team. Financial support from the Berkeley Stone Center on Inequality is gratefully acknowledged. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

1. Introduction

There is a large literature on the evolution and determinants of hours worked, drawing on labor force surveys that have been carried out in many countries sometimes going back decades. Yet, to date, no work has been able to put together all these data sources to construct truly global statistics on hours of work. The most thorough attempt to date is Bick, Fuchs-Schündeln, and Lagakos (2018), who construct cross-sectional labor statistics for 80 countries covering 41% of the world population.

A Global Working Hours Database. In this paper we mobilize labor force surveys to build a new global database of hours worked in 157 countries covering 97% of the world population in cross-section. We also construct time series spanning over three decades for 79 countries located in all regions of the world. This new data construction was made possible thanks to several recent developments.

First, in terms of data access, the International Labor Organization (ILO) and the World Bank have been gathering household surveys across the world and making them as comparable as possible (see Messenger, Lee and McCan 2007 for a description of the ILO data and Montenegro and Hirn 2009 for the World Bank data). Both the ILO and World Bank have access to survey data that are not publicly disclosed by the countries that created them. ILO has been willing to share its labor force survey data to help us create this global labor database.[1] The World Bank data can be accessed by its researchers for academic purposes.[2] A number of large developing countries have also started publicly sharing—or even creating—labor force survey data, notably China and India, which represent 35% of the world population and were not included in Bick, Fuchs-Schündeln, and Lagakos' (2018) seminal study.

Second, in terms of variables for the analysis, a number of recent studies, many as part of the World Inequality Database project, have built country-level and decades-long socioeconomic and public policy variables, particularly on taxes (Bachas et al. 2022) and government spending

[1] ILO also shared data for Gethin's (2025) study on education and global poverty reduction and for Fisher-Post and Gethin's (2023) study on government redistribution across the world.

[2] We have also been able to create cell-level statistics (by age and gender) using the Luxembourg Income Study for some countries, such as Japan, for which no public microdata exist.

(Fisher-Post and Gethin 2023, Gethin 2024b). This allows us to explore the effect of public policy on hours worked in a much broader and comprehensive way than previously done.

Third, in terms of methodology, a key concern emphasized by Bick, Fuchs-Schündeln, and Lagakos (2018) is that surveys carried out in specific periods of the year can create biased estimates of hours worked due for example to seasonal variations in agricultural work. As a result, Bick, Fuchs-Schündeln, and Lagakos (2018) focused primarily on a core database of 49 countries (out of their 80) covering 23% of the world population. Our careful investigation of seasonality using high-quality labor force surveys fielded over the entire year reveals that seasonality is minimal in most developing countries.[3] This gives us confidence that surveys that do not cover the full year still provide reliable information on annual hours worked.

Finally, we plan to publish a publicly available semi-aggregated database covering hours worked at the country×year×age×gender×education level, which will allow researchers to replicate all the results presented here and further explore hours worked and their determinants.

Substantive Findings. The analysis of our new database delivers a number of substantive findings, sometimes confirming and sometimes qualifying results from previous work. In all cases, we follow international conventions and measure weekly hours worked in all jobs that contribute to GDP. We thus include unpaid agricultural work but exclude unpaid home services (such as cleaning, cooking, and taking care of children or elderly family members).

First, we construct global labor statistics today, using population weights to represent the 97% of the world population that our surveys cover. 58% of the world's adult population is employed. They work an average of 43 hours per week. This implies that weekly hours per adult are about 24. We unsurprisingly find that global hours worked are very strongly bell-shaped with age, mostly due to the extensive employment rate margin. Women supply 35% of hours worked, while men supply 65%. This gender gap is mostly driven by the extensive margin.

Second, in terms of cross-country comparisons, we find that hours worked are mildly bell-shaped with GDP but weakly correlated with development overall. Increasing hours at low levels of development are driven by structural change: hours per worker in manufacturing and

[3]It is actually larger in richer countries due to summer holidays.

services are strongly bell-shaped with development and very high in middle-income countries, while hours in agriculture are moderate in level and flat with GDP per capita. Adult employment rates are uncorrelated with development. As a result, the implied unconditional elasticity of hours worked with respect to GDP is close to zero and statistically non-significant. We confirm this pattern in long time series covering 79 countries: GDP growth is not significantly associated with either increasing or declining working hours.[4]

Third, we document significant heterogeneity in this overall pattern by age and gender. Hours worked by the young (age 15-19) and the elderly (age 60+) fall with development. In basic cross-country regressions, these declines are entirely driven by rising school attendance and public pension coverage, in line with a broad body of work. In the time series, the fall of youth work is particularly pronounced while elderly work is stable (rather than falling). This suggests that developing countries have increased schooling faster but have not developed as generous pensions as the United States and Western Europe did in the past.

In contrast, we find that hours worked by prime-age adults (20-59) are flat, if not slightly increasing with GDP per capita. Female working hours rise with development, while male working hours decline but at a slightly lower pace. There is considerable heterogeneity in this pattern across countries and overtime. Muslim/Hindu religion depresses female hours worked enormously while formerly communist status increases them. The fall in male hours worked is driven by reduced hours per worker and is quantitatively offset by increases in female employment rates. This suggests that the process of development tends to equalize hours across genders, reducing the long hours of working men while allowing more women to become employed in GDP-generating activities. In many countries, these opposite dynamics by gender have exactly compensated each other, leading to a remarkable long-run stability of hours worked among prime-age adults.

Fourth, consistently with a body of work in richer countries, we find that labor taxes (but not consumption taxes) are strongly negatively related to hours worked both in international com-

[4]Bick, Fuchs-Schündeln, and Lagakos (2018) found a strongly decreasing pattern of hours of work with development in cross section. The main reason is that they did not cover as many low- and middle-income countries as we do, especially some countries with very low working hours such as Iran, Somalia, and Sudan.

parisons and within-country time series. In contrast, GDP per capita is only weakly positively correlated with hours worked once tax variables are controlled for, with an elasticity of around 0.1. As economic growth increases the wage rate (uncompensated labor supply effects) while labor taxes fund transfers (compensated labor supply effects), the traditional explanation in the macroeconomics literature is that this reveals substitution effects created by income effects. We do find that controlling for social government spending attenuates the labor tax effects, consistent with this explanation. However, this attenuation is only partial. In contrast, we find that controlling for the share of informal workers and working hours regulations almost entirely eliminates the link between labor taxes and hours. This suggests that labor taxes depress hours worked not through income and substitution effects but rather because they correlate with the development of formal work and the substantial regulations of working hours that come with it, which appear to be the main driver of the decline in hours at the highest levels of development.

Related Literature. There is a large literature on hours worked across countries and over-time, which we briefly describe to place our study in context.

Cross-Country Comparisons. As mentioned previously, Bick, Fuchs-Schündeln, and Lagakos (2018) have built the most comprehensive cross-sectional database on hours worked. Their core database covers 49 countries representing 23% of the world population (with an extended database of 80 countries covering 41%). Their main finding is that hours worked fall with economic development. Earlier cross-country work had mostly focused on richer countries (see for example Bick, Bruggemann, and Fuchs-Schündeln 2019) with a large body of work analyzing how taxes, retirement systems, regulations, or social norms can explain their differences.[5] The gender division of work has also received considerable attention (e.g., Bick, Fuchs-Schündeln, and Lagakos 2018; Bick et al. 2022; Gottlieb et al. 2024). Our new database allows us to considerably expand the scope of the analysis, as well as to reevaluate the roles of economic,

[5]On taxes, see Prescott (2004), McDaniel (2011), and Bick and Fuchs-Schündeln (2018). On government spending, see Rogerson (2006, 2007). On retirement programs, see Erosa, Fuster, Kamburov (2012) and Wallenius (2013). On regulations, see Botero et al. (2004), Messenger, Lee and McCann (2007), and Causa (2008). On social norms and institutions, see Alesina, Glaeser, and Sacerdote (2005). See also Breza and Kaur (2025) for a broader review of labor markets in developing countries.

cultural, and institutional factors in shaping working hours over the course of development.

Time Series. There is also a large literature on hours worked over time, generally focused on rich countries (e.g., Huberman 2004; Huberman and Minns 2007; Ramey and Francis 2009). Gilmore (2021) compiles a number of historical estimates over the past two centuries for various countries. Most recently, Andreescu et al. (2025) have constructed global harmonized series on work hours in 57 countries and world regions over 1800-2025. The key challenge is that historical data generally exist only for specific occupations rather than providing hours of work for all adults as modern labor force surveys do. One important exception is Ramey and Francis (2009) who build such series for the United States since 1900 using census and survey data. We will use their series as a comparison benchmark in our time series analysis. The historical gender gap in hours worked has also been studied extensively especially in the United States (e.g., Goldin 1990, 1995, 2024; Ngai, Olivetti, and Petrongolo 2024).[6] For more recent decades, work on the determinants of hours worked in time series has primarily focused on richer countries and the role of taxes (e.g., McGrattan and Rogerson 2004; Ohanian, Raffo, and Rogerson 2008). Our new database allows us to study long-run trends in hours worked and their determinants in 79 countries at all levels of development.

Our paper is organized as follows. We discuss the construction of the data in Section 2. We analyze global hours worked in Section 3. We provide cross-country comparisons in Section 4. We turn to time series evidence in Section 5. We analyze the role of taxes, social spending, and regulations in Section 6. Section 7 concludes.

2. A New Database on Global Hours Worked

This section describes the construction of our database on global hours worked. Section 2.1 covers data sources. Section 2.2 describes the data harmonization procedure. Section 2.3 presents descriptive statistics on the coverage of our database. Section 2.4 discusses potential biases

[6]See also Chiplunkar and Kleineberg (2025), who analyze gender employment patterns in 90 countries over the past five decades. Dinkelman and Ngai (2022) focus on female labor force participation in Africa in recent decades.

related to seasonality in hours worked.

2.1. Data Sources

We start from a total of 4,100 nationally representative household surveys. These surveys have typically been fielded by national statistical institutes and provide individual-level information on hours worked. We gather this unique set of household survey microdata by combining six groups of sources.

1) ILO Database. Our first source is the International Labor Organization's microdatabase. Based on a considerable data collection effort and with the collaboration of statistical institutes, ILOSTAT have harmonized over 1,300 surveys covering 130 countries since 1990. The database records individual-level information on hours worked, together with other key labor market and sociodemographic variables. About two-thirds of surveys are labor force surveys. The remaining third are multi-purpose surveys that record data on both labor market variables and other dimensions of households' economic conditions.

2) I2D2 Database. I2D2 is a microdatabase maintained by the World Bank. Thanks to a massive data harmonization effort similar to that of the ILO, the World Bank has assembled a large number of household surveys covering almost all countries in the world. The majority are living standard surveys primarily focused on income and expenditure. About 850 of these surveys contain a detailed labor module, however, which allows us to observe employment and hours worked.

3) Global Monitoring Database. The I2D2 was discontinued in 2017 and was replaced by the Global Monitoring Database (GMD). The primary focus of the GMD is to measure the distribution of household income and consumption. However, about 150 surveys, mostly covering recent years, also record information on hours worked as in the I2D2 database.

4) Global Labor Database. The Global Labor Database (GLD) is another data harmonization project recently launched by the World Bank. Its objective is to compile and harmonize labor force surveys, with a particular focus on developing countries. At the time of this writing, it contained about 350 surveys covering 28 countries.

5) EU-LFS. The European Union Labour Force Survey is a collection of harmonized labor force surveys maintained by Eurostat. It brings together almost 1,000 surveys fielded in 31 European Union countries, some of which go back to the 1980s.

6) Other Data Sources. We complement these five databases with additional surveys from various sources. The Luxembourg Income Study assembles household surveys covering mostly rich countries. IPUMS International brings together census sample microdata, some of which have recorded information on hours worked. The Life in Transition Survey allows us to cover a few additional countries in Eastern Europe and Central Asia. Finally, we download and harmonize 130 additional surveys from country-specific data portals and other sources, allowing us to further expand the coverage of our database in 10 countries.

2.2. Harmonization

Data Harmonization. Starting from these databases, we select and link sources to construct a single harmonized database on global hours worked. We proceed in two steps.

First, we remove surveys with incomplete coverage or inconsistent information on hours worked. This includes surveys that only asked hours worked for a subsample of the adult population. Most importantly, the 19th International Conference of Labour Statisticians in 2013 led to the adoption of a resolution that restricts the definition of employment to work performed for others in exchange for pay or profit. This implies that own consumption work (such as subsistence agriculture) is not counted as employment in a number of recent surveys adopting this definition even though such good producing work contributes to GDP and is quantitatively large for the poorest countries. We systematically remove from our database surveys fielded in low-income countries that rely solely on this new definition, ensuring that our

statistics on hours worked do cover unpaid agricultural work in countries with large agricultural sectors.[7]

Second, we select one survey per country-year. Indeed, some surveys are duplicated across the sources outlined above. In some cases, countries have also fielded several surveys covering work hours in the same year. We give priority to labor force surveys over other types of surveys. Given their particular effort at harmonizing labor market statistics, we also generally prioritize the ILO and GLD over other sources.

As an illustration, Appendix Figure A.1 depicts time series of hours per adult and hours per worker in four countries (Greece, Mexico, Philippines, and Pakistan) for the various sources and how we have selected a consistent series from those sources.

Definition of Hours Worked. Nearly all surveys follow the definition of hours worked in the framework of the National Income and Product Accounts. Hours worked include paid employment and unpaid work used in the production of output included in GDP, regardless of whether that output is sold or used for own consumption. It excludes hours spent on activities that are not recorded as output in the national accounts, namely service work that is not paid such as cooking, cleaning, or childcare within a household.

The vast majority of surveys in our database ask all household members aged 15 or above about actual hours worked in the past week. In a handful of cases where this information is not available, we rely on usual weekly hours worked.[8]

Variables of Interest In addition to work hours, we collect information on a number of other sociodemographic variables. Our harmonized database covers age in five-year bins, gender, school attendance, educational attainment, sector of employment, occupation, and earnings for both wage earners and the self-employed. Almost all surveys also provide information on the

[7] Thankfully, a number of surveys collect both definitions of hours of work. However, this change in definition is a serious issue for future comparative work on labor supply in less developed countries.

[8] See Appendix Table A.5. In the last survey year available, the data cover actual hours worked in 115 countries out of 157, amounting to 90% of the world's population. 19 countries only report data on usual hours. We were not able to identify whether the survey covered actual or usual hours for the 23 remaining countries. We hope to report more detailed information on how hours worked were collected in each survey in the future.

composition of the household.

2.3. Data Coverage

Appendix Figure A.2 depicts all the countries for which recent survey data are available for our analysis as well as the regional breakdown that we will use. Relative to the usual partition of countries by region, Middle East and North Africa is expanded to include Saharian/Sahel countries (Tchad, Niger, Mali, Mauritania), which are majority-Muslim and similar to North African countries in their hours worked patterns. Our data cover 97% of the world population. The missing 3% mostly consist in countries in the Middle East and North Africa, where surveys covering work hours either have never been fielded or have not been made available to either researchers or the World Bank or ILO.

The microdata cover a total of over 350 million individuals surveyed in 157 countries (see Appendix Table A.1). Some countries in Western Europe, the Anglosphere, Latin America, and Asia have data going back as early as the 1970s-1980s. We have less historical depth in the Middle East and Africa, but several countries still have surveys going back to the 1990s. All in all, our final database assembles about 2,300 surveys, allowing us to cover both the worldwide distribution of work hours today and high-quality time series spanning several decades in about 80 countries.

Appendix Table A.2 provides further information on the sources used in our final database. We stress the substantial complementarity between the six sets of sources available to measure work hours. For instance, the ILO microdatabase has the greatest coverage of high-quality labor force surveys, but little historical depth in comparison to I2D2 and the GLD. Other data sources, such as the LIS and country-specific surveys, are essential to further expand coverage. With this combination of sources, our microdatabase covers almost every labor force survey ever fielded that still has a usable microfile.

2.4. Seasonality

An important source of concern, previously highlighted in the literature, relates to survey representativeness over the calendar year (Bick et al. 2018; Bick et al. 2019). If a survey is fielded over a short period of time, it might not be representative of annual hours worked. Two sources of bias are particularly concerning. First, surveys might be under- or over-sampling holidays, which can introduce significant bias especially in high-income countries. Second, surveys may only cover specific times of the agricultural calendar, leading to a misrepresentation of annual hours worked in countries with large agricultural sectors.

The time coverage of the surveys in our database varies substantially. Some surveys were run over a couple of months in the year, while others were deliberately fielded over the whole year to account for seasonal fluctuations. Fortunately, the exact quarter of interview is available in a large number of these high-quality surveys, allowing us to directly investigate seasonality and the degree to which it could bias our measures of hours worked.

Figure 1, Panel (a) plots weekly hours per adult by quarter in a sample of 20 Western European countries. There is clear evidence of seasonality, in line with the existing literature (Bick et al. 2019). Hours worked are much lower in the third quarter, corresponding to the summer holidays. At the same time, this seasonality is limited, in the sense that restricting the analysis to one quarter or another would not lead to major rerankings in terms of which countries have higher work hours than others.

Figure 1, Panel (b) turns to developing countries. Seasonality is substantially lower in this sample of countries. In almost all countries, hours worked differ by less than 2 or 3 hours per adult across quarters. One should also stress that seasonality is likely to be overestimated in this group of countries, given that some of these surveys were fielded over the entire year but are not meant to be strictly nationally representative in each quarter.

In Appendix Figure A.3, we plot the correlation between measured hours worked across quarters in panel (a), as well as the distribution of quarterly deviations from annual averages across all 224 surveys with available data in panel (b). In the vast majority of surveys, the gap between hours worked in any quarter and the annual average is very small, falling below 5%.

We also investigate the implications of downward-adjusting hours worked to make them consistent with legal paid annual leave in each country, following Bick et al. (2019). This adjustment slightly reduces estimates of hours worked in rich countries but leaves the broad picture unchanged (see Appendix Figure A.3(c)).[9] This provides reassuring evidence that seasonality and misreporting of holidays are unlikely to significantly bias our estimates of hours worked and how they vary across countries and over time.

3. Global Hours Worked Today

3.1. Global Hours Worked

Table 1 reports global weekly hours worked statistics by gender and broad age groups for all adults (aged 15+) in our data representing 97% of the world population for the most recent year (generally 2022 or 2019; we exclude the years 2020-2021, which are affected by COVID).[10]

Worldwide, adults aged 15 and above work 24.1 hours per week on average on jobs contributing to GDP. Men work 31.4 hours and women 16.9 hours on average. Hence, women's hours worked are only 54% of men's hours worked. As a result, women provide 35% of global

[9]We construct holidays-consistent hours as follows. For Europe and the United States, we correct our series using data from Bick et al. (2019), who adjust hours reported in survey data using information on holidays from external sources. For other countries, we estimate adjusted hours as:

$$h_{adj} = \frac{\left((1 - \text{informal}) \times e \times h \times (52.14 - \frac{\text{leave}}{5})\right) + \left(\text{informal} \times e \times h \times 52.14\right)}{52.14}$$

with *informal* the share of informal employment, e the employment rate, h weekly hours per worker, and *leave* average paid annual leave measured in days (52.14 reflects that one year of 365 days has 52.14 weeks). This formula amounts to assuming that all workers in the formal sector took the average paid annual leave prevailing in their country in the past year. To get an upper bound on this adjustment, we include workers with zero hours in the calculation of h, which is equivalent to assuming that zeros in our data are not due to holidays. Results excluding zeros are similar and imply a smaller adjustment in all countries.

[10]Appendix Table A.5 shows the year used for each country.

hours worked (and men 65%).[11] Most of this gender gap is explained by the extensive employment margin as only 46% of women are employed compared to 70% of men, so that the female employment rate is 65% of the male employment rate. Conditional on employment, women work 39 hours, which is 85% of the 46 hours average for working men.

Table 1 also shows that hours worked are much lower for the young, defined throughout our paper as those aged 15 to 19, and the elderly, defined as those aged 60 and over. The young work only 7.4 hours per week on average because only 21% of them are employed. Symmetrically, the elderly work only 10.9 hours because only 32% of them are employed. Prime-age adults, defined as those aged 20 to 59, work on average 30.3 hours per week and 70% of them are employed, so that hours per prime-age worker are 44.1 on average. Conditional on being employed, both the young and elderly work 39 hours, almost as much as the prime-age.

Figure 2 depicts global average weekly hours worked per adult (aged 15 and above) in panel (a), employment rates per adult in panel (b), and weekly hours worked per worker in panel (c) by gender and 5-year age bins 15-19, 20-24, ..., 60-64, and grouping together those aged 65+.[12] As is well known within countries, the pattern of hours worked has a strong bell shape with age: it first increases sharply with age, then is relatively flat from age 25 to 54, and finally declines rapidly with age afterwards. This bell shape pattern is present for both men and women separately and is driven almost entirely by the employment rate extensive margin depicted in panel (b). Slightly over 90% of middle-aged men (age 30-49) work, while less than 30% of young (age 15-19) and elderly (age 65+) men do. Women's employment rates peak at slightly over 60%.[13] In contrast, the bell shape with age is much attenuated for hours of work conditional

[11] We also find that women earn about 35% of global labor earnings (using purchasing power parity), consistent with the recent results of Neef and Robilliard (2021) also reported in the World Inequality Report 2022 (Chancel et al. 2022, Figure 12). This does not mean however that there is no gender gap in wages within each country (see Andreescu, Loubes, Piketty, and Robilliard 2025). As we shall see, women work more than 35% of hours in richer countries and richer countries contribute disproportionally more to global earnings. This compositional effect counterbalances the wage gender gap within countries, which explains why women both work 35% of global market hours and earn about 35% of global earnings. Recall that our measure of hours worked excludes unpaid family labor services (such as childcare, cooking, cleaning, etc.) as they are not included in GDP. See Andreescu, Loubes, Piketty, and Robilliard 2025 for statistics including both paid and unpaid work by gender for 57 countries over the long-term.

[12] This bell-shaped pattern of hours of work with age has been presented in previous work notably by Blundell, Bozio, and Laroque (2013) for the US, UK, and France and Bick et al. (2018) for their core sample of 49 countries.

[13] The sharper decline in employment for women in their 50s–relative to men–is largely driven by China and its early retirement policy for women.

on working as depicted in panel (c): young and elderly workers work only slightly less than prime-age workers.

3.2. Hours Worked by Country Income Group

Next, we examine in Figure 3 hours worked by stages of development using the World Bank grouping of countries (as of 2023) in four groups: low-income, lower-middle-income, upper-middle-income, and high-income.[14] Estimates are always weighted by adult population size in each country to be representative of the 97% of the world adult population covered by our data.

Panel (a) depicts hours of work per adult for all adults (black bars), men (blue bars), and women (pink bars). Panel (a) shows that hours of work first increase modestly across the bottom three country groups from 23 hours in low-income countries to 26 hours in the upper-middle income group, and then decrease sharply for high-income countries where they are lowest—20 hours per adult. Interestingly, men's hours worked peak earlier, in lower-middle-income countries while women's hours peak in upper-middle income countries. Hours worked among men decline very substantially from 35 hours in lower-middle-income countries to 24 hours in high-income countries.[15]

Panel (b) depicts hours of work per adult using our broad age groups: young (aged 15-19), prime-age (age 20-59), and elderly (age 60+). The width of each bar is proportional to its population size to illustrate the quantitative importance of population aging with development status. For the prime-age, hours worked increase and then decrease with economic development as in panel (a). In contrast, hours of work among the young and especially the elderly decrease with economic development. Both the young and the elderly work more than twice longer in low-income countries relative to high-income countries. Interestingly, the reduction in hours for

[14]The classification can be found online at `https://datatopics.worldbank.org/world-development-indicators/the-world-by-income-and-region.html`.

[15]Appendix Figure A.5 decomposes hours of work by gender and stage of development into the employment rate and hours per worker margins. Employment rates for women first decrease and then increase with development, while employment rates for men decline slightly with development. Hours per worker are bell shaped with development both for men and women.

the young happens "earlier" (lower-middle income) than for the old (upper-middle income).[16]

Panel (c) depicts hours worked per worker by industry and stage of development using the World Bank grouping of countries as of 2023. Estimates are weighted by adult population size in each country to be representative. Again, the width of each bar is proportional to the corresponding size of the workforce to illustrate the shifts across industrial sectors by development status. Panel (c) shows that hours per worker first increase slightly and then decrease sharply in all sectors except in agriculture where they increase slightly even for richer countries. Except for high-income countries, hours in agriculture are substantially lower than in other sectors. Because the share of agriculture is so large in poorer countries and declines so dramatically, this contributes to the increase in hours in the early stage of development.

4. Cross-Country Comparisons

It is useful to disaggregate the data further by country following the pioneering study by Bick, Fuchs-Schündeln, and Lagakos (2018). Relative to their study, we always consider population weighted estimates so as to be representative of the full world population. We provide unweighted analysis and a reconciliation with Bick, Fuchs-Schündeln, and Lagakos (2018) in appendix Figure A.4 (see below). In our graphs, we depict each country as a single circle. To represent global hours worked, the area of each circle is proportional to the adult population in each country. We also use colors for world regions (as in Appendix Figure A.2) and we report the names of the largest countries (adult population above 50 million). This representation illustrates well the heavy weight of India and China, about 35% of the world population, in global hours worked. In all such figures, we also depict the best quadratic fit (in the weighted cross-country data). A quadratic fit is useful to uncover non-monotonic patterns across countries.

[16] Appendix Figure A.6 decomposes hours of work by age groups and stages of development into the employment rate and hours per worker margins. The employment rate of prime-age workers increases with development while it falls for the young and elderly. Hours per worker are bell-shaped with development for all groups and fall dramatically for the young in high-income countries where the young more often combine schooling with part-time work. The elderly in lower income countries tend to be younger on average than in richer countries. Appendix Figure A.12, Panel (a) shows that controlling for the age composition of the elderly within countries does not change the overall pattern.

4.1. Hours Worked and Employment

Figure 4 depicts average weekly hours of work per adult (aged 15+) in panel (a), employment rates per adult in panel (b), and weekly hours of work per worker in panel (c), by country ranked by log GDP per adult in 2023 PPP USD. Panel (a) shows a bell shape of hours of work per adult with development status consistent with our analysis in Figure 3(a). This cross-sectional graph also illustrates the wide heterogeneity in hours worked even conditioning on economic development. Hours per adult in some Sub-Saharan countries such as Madagascar and Tanzania are almost twice as high as comparably poor countries such as Afghanistan or Sudan. As we show in appendix Figure A.4, Bick, Fuchs-Schündeln, and Lagakos (2018) find a declining pattern of hours of work with development because their data are less complete at the middle and low ends of the development spectrum. Weighting by population–which we do and they don't–further accentuates the initial rise in hours with GDP per capita. Table 5, Panel A summarizes our cross-country findings. The first column shows no overall correlation between hours of work per adult and log GDP per adult in our full (weighted) sample.

Panel (b) shows overall stability of the employment rate with development and panel (c) shows a bell shape of hours per worker, with a clear and marked decline for higher income countries. As a simple illustration, while employment rates are similar in China and Germany, hours of work per adult are over 50% higher in China than in Germany. The heterogeneity conditional on GDP per adult is more pronounced in employment rates than in hours per worker, and is driven by strong gender differences as we shall see below.

With our micro-data, we can also study the variance of hours of work *among workers* within each country. Figure 5 depicts the standard deviation in weekly hours of work per worker in panel (a), and the 10th and 90th percentiles (P10 and P90) of weekly hours of work per worker in panel (b), by country ranked by log GDP per adult in 2023 PPP USD. Panel (a) shows a clear decline in the standard deviation of hours of work per worker with development. Panel (b) shows a decline of long hours (90th percentile of hours per worker in each country) with GDP per adult and a slight bell shape of short hours (10th percentile) with GDP per capita. This suggests that there is more uniformity in hours of work at higher levels of development and that

very long hours, such as 60 hours or more, become very rare in higher income countries. For example, in rich countries such as the US, France, and Germany, less than 10 percent of workers work in excess of 50 hours while in most poor countries, at least 10 percent of workers work in excess of 60 hours. This growing uniformity and disappearance of long-hours is consistent with the rise of formal employment and working hours which correlate strongly with the decline in hours with development as we show in Section 6.

4.2. Industry

As the bell shape of hours with development is driven primarily by the intensive margin, it is fruitful to look at hours of work per worker by broad industrial categories. Appendix Figure A.7 depicts average weekly hours of work per worker by industry and by country ranked by log GDP per adult in 2023 PPP USD. We divide workers into four broad industrial groups: (a) agriculture, (b) manufacturing, (c) market services, (d) government/education/health services. The last category is essentially government workers but also includes workers in education and health in the private sector.

Agriculture stands out with a stable pattern of hours per worker across countries by development status. Agricultural workers tend to work 40 hours per week on average, in low-, middle-, and high-income countries.

In contrast, the three other industrial groups show a clear bell shape pattern of hours of work with GDP per adult. Hours per worker first increase and then fall with development. The fall is larger than the increase, especially for services (market and government). In middle-income countries, hours of work in manufacturing and especially market services are very high at around 50 hours per week, much higher than in the agricultural sector. This is consistent with the very high hours of work in the early stages of industrialization in the late 19th and early 20th centuries, which then came down as regulations on overtime work were introduced (see Gilmore 2021 and Andreescu et al. 2025 for recently compiled historical data). Hours of work in government/education/health services are generally somewhat lower than market services in most countries, as governments typically set lower working hour standards for government

workers relative to private sector workers.

Therefore, the bell shape of hours of work per worker with GDP per adult can be understood as follows. Hours of work per worker are around 40 in very poor countries, where agriculture dominates with typical hours around 40 per week (see appendix Figure A.8 for the fraction of workers in each sector across countries). With development, the share of workers in manufacturing and private services grow and these sectors tend to have substantially longer hours than agricultural work. This creates the rising pattern at very low levels of development. At higher levels of development, hours of work in manufacturing and private services decline and the government/education/health service workers share further grows and have lower hours. We show that the decline correlates strongly with the development of the social state, taxes, spending, and especially formal employment and working hours regulations in Section 6. This creates the declining pattern at higher levels of development.[17]

4.3. Age

As we discussed earlier, the young and old work a lot less than the prime-age. Therefore, Figure 6 depicts average weekly hours of work per adult separately for prime-age adults (age 20-59) in panel (a), for the young (age 15-19) in panel (b), and for the elderly (age 60+) in panel (c) by country ranked again by log GDP per adult in 2023 PPP USD.[18]

Panel (a) shows a weak bell shape of prime-age hours of work with development consistent with our previous analysis. The lower hours among very poor countries are driven mostly by some very poor Asian, Middle-Eastern, and Sahelian countries such as Afghanistan, Sudan, and Yemen depicted in brown on the figure (very poor Sub-Saharan countries tend to have higher hours). Table 5, Panel A shows no correlation between hours of work per prime-age adult and log GDP per adult (col. 2).

Panel (b) shows a notable decline of hours of work of the young with development. Panel

[17]This pattern is also consistent with Bick, Blandin, and Rogerson (2022) model of structural change in labor supply along the development spectrum, with a self-employment sector with low fixed costs (agriculture) and a modern wage-employment sector with high initial fixed costs (and hence long hours) that fall overtime as the modern sector absorbs most workers.

[18]The decomposition in employment rates and hours per worker is provided in appendix Figures A.9, A.10, and A.11.

(c) shows an even stronger decline of hours of work of the elderly with development.[19] It is again important to note the great heterogeneity across countries particularly among the young and the elderly. The elderly and the young work a lot in many Sub-Saharan African countries (Ethiopia stands out for the young and Nigeria stands out for the elderly) but little in several poor muslim countries such as Sudan or Yemen.[20]

Schooling and Hours of Work of the Young. Naturally educational attainment increases with development (see, e.g., Gethin 2024), implying that young workers (15-19) are more likely to attend school in richer countries, and hence have less time available for work. Therefore, it is valuable to analyze the link between hours of work of the young and their school attendance. Figure 7 panel (a) depicts the correlation between school attendance and hours of work for the young (age 15-19) across countries.[21] It shows a strong negative correlation between school attendance and hours of work of the young consistent with a key role of school attendance in reducing their hours worked. For example, in Russia, about 90% of the young aged 15-19 attend school and they work only 2 hours per week on average. In contrast, in Pakistan only 52% of the young attend school and they work 12 hours on average.

Table 2 reports results from cross-country regressions of average hours of work of the young by country on various determinants. Estimates are weighted by adult population size in each country to be representative. The sample includes 143 countries for which the determinants we consider are available. It covers 91% of the world adult population. Hours worked by the young are negatively correlated with log GDP per adult (column 1). School attendance of the young is the main determinant for their hours worked (cols. 2-4). Increasing school attendance by 1 point decreases hours of work by .25-.30 hours (with an unconditional mean of 7.0 hours worldwide). Just including this variable explains 60% of the variation across countries (Adjusted $R^2 = .60$ in col. 2) which is much higher than the Adjusted $R^2 = .13$ when including only GDP. When

[19] Table 5, Panel A cols. 5 and 6 show the quantitative magnitudes.

[20] Appendix Figure A.12(b) compares actual hours of the elderly to hours of the elderly when reweighing to match the US elderly age composition. Controlling for the age structure has only a small impact on elderly hours.

[21] School attendance is reported in the labor force surveys, so we construct these measures directly from the microdata. Notice that the relationship between school attendance and hours worked is not mechanical, as young adults may be both attending school and working or doing neither.

including school attendance, the coefficient on log GDP per adult becomes weakly positive (col. 3). Finally, col. 4 shows that a higher agricultural share increases hours of work of the young (even when all the other variables are included). This is consistent with a broad body of work (see e.g. Hindman 2014) showing that children or young adults are likely to work in family businesses which are prevalent in agriculture. With sectoral composition and school attendance variables, hours of the young are strongly positively related to GDP per adult (col. 4). This suggests that hours of work of the young are not reduced through income effects but rather through substitution with education and shifts in the sectoral structure. Therefore, while the elderly in richer societies work less, this is not necessarily due to an income effect on elderly labor supply but is mediated through the development of pensions in richer societies. As we shall see in our time series analysis below, such pension development is not an inevitable consequence of economic development.

Pensions and Hours of Work of the Elderly. Panel (b) of Figure 7 depicts the correlation between pension coverage (defined as the fraction of adults aged 60 and above living in a household where at least one person receives a pension) and hours of work of the elderly (age 60+).[22] The figure shows a strong negative correlation between pension coverage and hours of work of the elderly across countries consistent with a key role of pensions in reducing hours of work of the elderly. Poor countries in Sub-Saharan Africa have minimal pension coverage and high hours of work among the elderly. Western European countries as well as China and Russia have high pension coverage and low hours of work among the elderly.

To explore the determinants of hours worked of the elderly across countries, Table 3 reports results from cross-country regressions of average hours of work of adults aged 60 and above on various determinants. Estimates are weighted by adult population size in each country to be representative. The sample includes 91 countries for which the determinants we consider are available. It covers 63% of the world adult population. Hours worked by the elderly are

[22]We construct this measure of pension coverage by combining data from three sources: the World Bank's ASPIRE database for developing countries, the EU statistics on income and living conditions for European Union countries, and the CPS for the United States. Unfortunately, most ASPIRE surveys only report pension receipt at the household level, which is why we cannot construct a measure of pension coverage at the individual level.

negatively correlated with log GDP per adult (column 1). Column 2 shows that pension spending as a fraction of GDP and the fraction of the elderly population are negatively related to hours of work of the elderly. However, pension coverage is even more strongly negatively correlated with hours worked among the elderly (cols. 3-5) and fully explains the negative relationship with GDP (col. 4). The size of the workforce in manufacturing is also negatively correlated with elderly hours worked as the manufacturing sector tends to be organized in large unionized firms, which can offer pensions before general pension systems are created by the government.

4.4. Gender

Figure 8 depicts average weekly hours of work per adult for prime-age men in panel (a) and prime-age women in panel (b).[23]

For prime-age men in panel (a), there is a very clear bell shape of hours of work per adult with log GDP per adult. Men in middle-income countries work substantially more (over 40 hours a week) than in low-income countries (around 35 hours a week) and especially high-income countries (about 30 hours a week). As we saw, this is driven by the intensive margin as the employment rate of prime-age men is very high in most countries (see Figure A.13(a)) and can be explained by the sectoral evolution by development status (Appendix Figure A.7).

In panel (b) for women, we group countries in three groups most relevant for female hours worked: former communist countries in red, Muslim/Hindu countries in green, and other countries in blue. Panel (b) shows a fairly strong increase of female hours of work with development on average but with substantial heterogeneity across countries. Hours are particularly low among Muslim/Hindu countries (in green). The 20+ countries where prime-age women work less than 15 hours all but one belong to this category.[24] Within Muslim countries, how much women work is more closely related to social norms and women's rights to work, rather than economic development. Women work equally little (5-6 hours a week) in Iran or Egypt, middle-

[23]The decomposition into employment rates and hours per worker is provided in appendix Figures A.13 and A.14.

[24]The only exception is Bosnia which is slightly below 50% Muslim and is in the former communist group.

income countries, than in Sudan or Afghanistan, very low-income countries.[25] Indonesia, the largest Muslim country by population, is comparable to Iran in GDP per adult but has much higher hours for women (21 vs. 5).

Conversely, hours for prime-age women tend to be high among former communist countries (in red), which is a legacy of communist systems that generally required men and women to work the same hours. Other countries (in blue) are generally in between and do not display a clear trend with economic development. Appendix Figure A.15 shows that, when excluding Muslim/Hindu countries, hours of prime-age women are slightly bell shaped with development, a combination of a strongly bell-shaped pattern of hours per worker and a slightly U-shaped employment rate with development.

To get a more quantitative evaluation, Table 4 reports results from cross-country regressions of average unconditional hours of work of prime-age women on various determinants. Estimates are weighted by adult population size in each country to be representative.[26] As we saw earlier, there is a weak positive relationship between female prime-age hours and log-GDP per adult (col. 1). The Muslim/Hindu population share has a very strong negative impact on hours of work. Being a 100% Muslim/Hindu country (relative to 0%) reduces hours by about 13 hours (relative to a global mean of 21.7). Being a formerly communist country increases hours of work by about 6 hours (col. 2). In contrast, the fraction of prime-age women living with young children aged 0-5 does not significantly correlate with prime-age female hours of work. The adjusted R-square of just including these 3 variables is a remarkable 76%. The strong effects of Muslim/Hindu shares and former communist status hardly change when adding controls (cols. 3-4) showing that this is a very robust relationship. When combining these 3 variables with log-GDP per adult, the correlation of hours with GDP becomes weakly negative instead of positive. When adding industrial sector shares, the relationship with GDP becomes again somewhat positive. A high agricultural sector share is highly correlated with low GDP per

[25]Saudi Arabia, Kuwait, or the Emirates, which are higher income and Muslim are not in our database unfortunately.

[26]For each column, the sample includes only the 132 countries (out of the 157 in our database) where all variables are available so that the different columns are directly comparable. These countries represent 86% of the world population.

capita but also high female hours of work as agriculture is often organized as family businesses where both men and women participate.

Table 5, Panel A shows that hours of work of prime-age men are negatively related to GDP per adult while hours of work of prime-age women are positively correlated. The two effects offset each other approximately as a 1 point log GDP per adult increase is associated with a decrease of prime-age male hours of .022 and an increase of prime-age female hours of .030 (both significant).

5. Time Series Comparisons

As discussed above, we have gathered time series of labor force surveys for as many countries as we could. We have long panels—spanning at least 3 decades—for 79 countries broadly distributed across regions and along the development spectrum. This allows us to analyze time series evolutions and assess whether they match the cross-country comparisons we have analyzed in Section 4 and further refine our explanatory mechanisms.

5.1. Prime-Age Adults

We start with prime-age adults and then turn to the young and the elderly in the next subsections.[27]

Figure 9 depicts the evolution by decade of average weekly hours of work per adult for prime-age adults (age 20-59) in panel (a), and separately for prime-age men and prime-age women in panel (b) for regions and countries for which we have long time series available.[28]

Hours are plotted against country or region log GDP per adult in the corresponding period (expressed in 2023 PPP USD). In the series the last dot is the 2020s (excluding COVID years 2020-21), the next to last dot is the 2010s, etc. For each decade, we take the average of all the

[27] Appendix Figure A.16 presents hours of work for all adults with a decomposition into employment rates and hours per worker.

[28] The decomposition in employment rates and hours per worker is provided in appendix Figures A.17 for all prime-age adults, A.18 for prime-age men, and A.19 for prime-age women.

surveys available in the decade for each country. We always weight by population size.[29]

The long time series for the United States combines Current Population Survey data since 1962 with Ramey and Francis (2009) data for 1900-1959. This very long US time series is useful to compare an advanced economy in its earlier stage of development with current low- to middle-income countries. As we have discussed earlier, the United States is the country for which there exists very long homogeneous series covering the full population working in all industrial sectors, making it truly comparable to the modern micro-data labor force surveys we use.[30]

Panel (a) in Figure 9 shows striking stability over decades of hours of work of prime-age adults in each region/country. The Ramey and Francis (2009) US series have almost perfect stability over a century (except for the Great Depression dip in the 1930s). Developing countries tend to show a slight increase, perhaps most marked in Sub-Saharan Africa. Europe and Latin America, where we have the most comprehensive set of countries, show almost perfect stability over 4 decades or more. Table 5, Panel B, col. 2 confirms that there is a very small positive relationship between hours of work and log GDP when pooling the 2027 surveys with long time series (at least two decades) and including country fixed effects.[31] This is consistent with the cross-country analysis displayed in Table 5, Panel A.

5.2. Gender

However, this stability of hours over time masks striking offsetting trends by gender. Panel (b) in Figure 9 repeats the same time series but disaggregated by gender. It shows that hours of work generally increase for prime-age women while they symmetrically decrease for prime-age men explaining the stability in panel (a). The increase of hours for women is almost universal. It takes place both in regions that have grown slowly such as Latin America (in green) or in fast growing countries such as Indonesia or Bangladesh. Appendix Figures A.18 and A.19 show that

[29]When we depict time series for a region, we re-weight each survey-country to make sure it puts the same weight on each country in each decade so that the series are consistent over time.

[30]In contrast, historical series of work hours generally cover only manufacturing or even a specific occupation within manufacturing (see Gilmore 2021 and Andreescu et al. 2025).

[31]The US includes only the CPS data since 1962, not the earlier Francis-Ramey series.

the decrease for men comes from the intensive margin while the increase for women comes from the extensive margin.[32] This suggests that this is not solely related to economic development but also reflects broader societal evolutions. Table 5, Panel B confirms that, in the time series with country fixed effects, hours of work of prime-age men are negatively related to GDP per adult while hours of work of prime-age women are negatively correlated, and the two effects offset each other. Quantitatively, these OLS coefficients for men vs. women are twice as large as in the cross-section of countries analyzed in Panel A. This implies that the replacement of men long hours by a higher employment of women is taking place sooner (as measured by real GDP per adult) in current developing countries than it did historically in frontier economies.[33]

5.3. Young

Figure 10 panel (a) depicts the evolution by decade of average weekly hours of work per adult for the young (age 15-19) for regions and countries for which we have long time series available.[34] Panel (a) shows almost universal and often large declines in hours of work of the young over time within regions/countries. The drop is particularly large in Latin America and takes place in a context with very low economic growth.

Column 5 of Table 5, Panel B confirms the sharp drop of hours of work of the young (-7.6 hours per unit of log GDP per adult), which is five times as large as in the cross section in Panel A. This implies that hours of work of the young are coming down faster within countries than would be expected just based on economic growth measured by real GDP per adult. It is likely that the development of schooling has been proceeding faster in developing countries than it did in the frontier economies of the past, perhaps as international organizations such as the World Bank have promoted education as a key ingredient for development (see e.g. Jones 2007).

[32]Further analysis within countries shows that the increase for female employment rates is driven by women in couples with much less change for single women.

[33]For example, the Netherlands in 1970 had a prime-age female employment rate in the low 20s (Saez 2021, Figure 6A) comparable to Afghanistan today (appendix Figure A.14(a)).

[34]The decomposition in employment rates and hours per worker is provided in appendix Figure A.20.

5.4. Elderly

Figure 10 panel (b) depicts the evolution by decade of average weekly hours of work per adult for the elderly (aged 60+).[35] In contrast to the young, panel (b) shows general stability in hours of work of the elderly over time within regions/countries (except for the US long time series, which displays a steep decline over 1900-1960s).

Table 5, Panel B, col. 6 confirms that hours of work of the elderly within country are not falling with GDP per adult in the panel analysis, while they are falling sharply in the cross section in panel A. This implies that developing countries today are not following the path of richer countries in the middle of the 20th century which experienced large drops in elderly hours worked (that mostly precede our data, see e.g. Blundell, French, and Tetlow 2017). It is likely that developing countries today are not mimicking the development of very generous pensions that many richer countries did in the past. Again, it is possible that the experience of richer countries (many of which are trying to now increase again elderly hours worked) and the recommendations of international organizations on sustainable government spending have influenced pension policy decisions in developing countries (see e.g. Queisser 2000).

The key conclusion is that public policies such as education and pensions, which influence hours worked by the young and elderly, can take different paths over the development process and are not fully determined by GDP per adult.

6. The Role of Taxes, Transfers, and Regulations

6.1. Conceptual framework

Considerable attention has been put in analyzing the role of taxes in shaping hours worked. As we discussed, the very large variation in real wage rates across countries (proxied by GDP per capita) is associated with fairly modest differences in hours of work. In the standard labor supply model, this implies that uncompensated hours worked elasticities are small. This point has been made many times in the literature (see, e.g., Bick et al. (2018) across countries and

[35] The decomposition in employment rates and hours per worker is provided in appendix Figure A.21.

Andreescu et al. (2025) in long time series).

However, taxes are different because they are used to fund programs that benefit taxpayers. As a result, at the macro level, increasing taxes on labor income combined with an increase in transfers is akin to a compensated reduction in the wage rate (as Prescott 2004 famously noted).[36] With zero uncompensated hours worked effects, substitution effects are equal to minus income effects on hours worked and can be positive and even large. In our cross-country/time series regressions, we expect the effect of taxes on labor income to capture substitution effects, i.e., compensated hours worked elasticities. This point has been made by previous studies on the macro-level effect of taxes on hours worked (see e.g., Prescott 2004, Rogerson 2008, McDaniel 2011, Bick and Fuchs-Schündeln 2018, Bick et al. 2022).

In our study, we can combine our hours worked data with data on tax rates across the world and over time recently created by Bachas et al. (2022). They create macro-level average tax rates on labor income, on capital income, and on consumption that are fully consistent with national accounts in each country. Therefore, the tax rates we use reflect actual average tax rates, and automatically factor in tax evasion and tax avoidance, common in the large informal sectors of less developed countries.

Theoretically, the standard intertemporal model of utility maximization $\sum_t \delta^t u(c_t, l_t)$ with budget set $a_{t+1} = (1 + r(1 - \tau_K))a_t + w_t l_t(1 - \tau_L) - c_t(1 + \tau_C)$ generates a first order condition for hours worked:

$$u_{ct} \cdot w_t \cdot \frac{1 - \tau_L}{1 + \tau_C} + u_{lt} = 0,$$

where u_{ct} and u_{lt} are the marginal utility of consumption and hours worked. Therefore, what matters for the hours worked decision is the real net wage $\bar{w} = w \cdot (1 - \tau_L)/(1 + \tau_C)$, net of both labor taxes (which reduce take home pay) and consumption taxes (which reduce the real purchasing power of take home pay). In this basic model, the capital income tax τ_K does

[36] If there is only a single representative individual, then a small increase in the tax that is rebated lump-sum generates primarily a substitution effect. This is exactly true when starting from a zero tax situation. With a preexisting tax on labor at rate τ_L, the elasticity is $\varepsilon = \varepsilon^c/(1 - \eta \cdot \tau_L/(1 - \tau_L))$ where $\eta \leq 0$ is the marginal propensity to earn, which is the income effect, and ε^c is the compensated elasticity. The denominator (larger than 1) captures the fact that the rebated tax is smaller due to the labor supply response attenuating the elasticity relative to a pure substitution effect.

not directly affect hours worked choice although it could indirectly affect it through general equilibrium price effects on w and r. In our analysis, we will include separately the log of tax wedges $1-\tau_L$, $1/(1+\tau_C)$, and $1-\tau_K$. Under standard theory, the first two terms should have the same impact.

6.2. The Role of Taxes

Let us start with some simple graphical illustrative analysis. Combining Bachas et al. (2022) tax data with our country-level data, Figure 11 depicts the correlation between average labor tax rates and unconditional hours of work per adult for prime-age men in panel (a) and prime-age women in panel (b).[37]

Panel (a) shows a strong negative correlation between labor tax rates and hours of work of prime-age men across countries. Countries with high labor tax rates tend to have lower unconditional hours of work per adult. Panel (b) shows that this negative correlation also holds for women if we exclude Muslim/Hindu countries, which have much lower female hours worked as we discussed above (the quadratic fit on panel (b) excludes those countries; the regression analysis below will control for Muslim/Hindu population shares and deliver a similarly very strong relationship between taxes and female hours worked).

The negative relationship for Western Europe and the Anglosphere (depicted in blue on the graph) was known from the previous studies we mentioned focusing on OECD countries. What is striking is that the relationship continues to hold when including less developed countries, which tend to have both lower labor taxes and higher hours per adult for men (India and China prolong the negative relationship among richer countries remarkably well). The quantitative correlation is large with hours dropping from 42 hours in countries with almost no taxes on labor income down to 28 hours–a 1/3 drop–in countries with large labor taxes (around 45-50 percent). It is also of note that there is substantial heterogeneity in male hours for countries with low labor tax rates. For women and excluding Muslim/Hindu countries, the drop is similarly

[37]We depict prime-age workers because we know from our previous analysis that hours worked of the young and hours worked of the elderly are driven primarily by education and pension policies. Our regression analysis below will consider each age group separately.

quantitatively large from 28 hours in countries with almost no labor taxes down to 18 hours in countries with large labor taxes.

A regression analysis allows us to do a more systematic correlation analysis while controlling for log GDP per adult and the Muslim/Hindu population share, and explore cross-country correlations as in Figure 11 as well as time series within countries. Table 6 reports results of regressions of various measures of log-hours worked (across columns) on tax rates on labor, capital, and consumption across countries in panel A and in panel analysis with country fixed effects in panel B. We regress the log of hours worked on the log of net-of-tax rates, so that estimates can all be interpreted as elasticities of hours worked with respect to net-of-tax rates. Estimates are weighted by adult population size in each country to be representative. The sample in panel A covers 92% of the world adult population.

In Table 6 panel A, we find that $\log(1-\tau_L)$ is always strongly related to log-measures of hours worked. Unconditional hours per adult has an elasticity of 1.3 and the elasticity exists both along the intensive margin (hours per worker has an elasticity of .8) and along the extensive margin (employment rate has an elasticity of .5). The elasticity for prime-age men is large (.9) confirming what we saw in Figure 11(a). The elasticity for women is even larger at 1.2. The control for the Muslim/Hindu population share is indeed highly negative and significant and needed to uncover this large elasticity as we discussed in Figure 11(b).

In contrast, the consumption tax wedge $\log 1/(1+\tau_C)$ is generally not positively related to labor supply. The coefficient is either insignificant or actually negative (and marginally significant). This is not consistent with the standard model we sketched out unless it is the case that consumption taxes fund government expenditures that are not transferred back to individuals and hence do not generate negative income effects on labor supply. Examples of such expenditures would be public goods such as infrastructure, law and order, defense. We will explore this avenue next by drawing on the worldwide database on public spending compiled by Gethin and Fisher-Post (2024) and Gethin (2024b). Finally, we do not find an effect of capital tax rates on labor supply either. The coefficients are small and generally insignificant.

When controlling for the evolution of taxes, we find that the coefficient on log GDP per

adult is positive and generally significant but small in magnitude, typically less than .1. As GDP per adult proxies for economic development and hence the average wage in the economy, this suggests that the uncompensated elasticity of hours of work with respect to the wage rate is quantitatively small. The dramatic discrepancy between this elasticity and the large elasticity we find with respect to the net-of-labor tax rate is consistent with the interpretation that the elasticity with respect to taxes captures compensated effects which can be large if income effects are also large.

Time Series Evidence. In Table 6 panel B, we present the time series analysis where we include country fixed effects. We also include a time trend in each regression to capture the secular increase in female hours of work and symmetric decline in male hours of work that we documented earlier. The elasticity of hours per adult with respect of $\log(1-\tau_L)$ remains positive and significant but smaller: 0.37 (instead of 1.27). It arises solely from the intensive margin with no extensive margin effect. For prime-age workers, the elasticity is significant for men (.37) but it is close to zero (-.04) for women in sharp contrast with Panel A.[38] The elasticity of hours with respect to GDP per adult is positive and generally significant, typically around .1 (similar in magnitude to Panel A).

Therefore, the panel analysis in Panel B reveals two large discrepancies relative to the cross-sectional analysis in Panel A. First, the elasticity with respect to $1-\tau_L$ is much smaller. Second and more specifically, the elasticity for women in time series is zero while it is very large in cross section.

[38]Without controlling for a time trend in the regression, the elasticity of female hours of work with respect to $1-\tau_L$ becomes negative and significant at -.65 (and the elasticity for prime-age male hours becomes larger at .91) capturing the symmetric evolution of male vs. female hours and the fact that on net labor taxes tend to increase over time.

6.3. The Role of Transfers

Using data on government transfers, it is possible to test whether the high labor tax elasticities are driven by income effects created by transfers funded with labor taxes.[39] To do so, we divide government spending (expressed as a fraction of GDP) into three categories: health, social protection (which includes all cash and quasi-cash transfers to individuals), and other expenditure. In principle social protection is the key component that can reduce labor supply through traditional income effects.

Table 7 Panel A presents the results in cross-country regressions.[40] The first row repeats the elasticity estimates from Table 6; the second row presents the elasticity estimates when adding the three variables on government expenditure.[41]

Adding government spending controls generally attenuates the elasticity. The attenuation is strong along the employment rate margin, and for prime-age women but nil for prime-age men. Therefore, the traditional explanation of income effects can at best only partially explain why the elasticity with respect to $1 - \tau_L$ is so large.

The social protection part of government spending, which includes all cash transfers does not come out as significantly negative.[42]

Our tentative conclusion based on this analysis is that transfers and income effects can partially but not fully explain why labor taxes are so strongly negatively related to hours of work. Conceivably, labor taxes proxy for social state development, which includes not only economic transfers but also labor regulations (overtime, paid vacation, etc.) that can also affect hours of work and to which we now turn.

[39] Rogerson (2006, 2007) and Rogerson and Wallenius (2009) made the point that the structure of transfers is crucial to understand the macro-economic effect of taxes and provide empirical analysis along those lines for richer countries.

[40] The results for panel analysis are presented in Panel B of appendix Table A.3.

[41] In all these regressions, we also include the full set of variables that were included in Table 6. The full set of coefficients is reported in appendix Table A.3, Panel A.

[42] In the time series as reported in Panel B of appendix Table A.3, the social protection part of government is negatively correlated with hours of work but adding the spending variables also has a relatively small attenuation effect on the elasticity of hours with respect to $1 - \tau_L$.

6.4. The Role of Regulations

The development of the social state and the large labor taxes that fund them is correlated with the development of working hours regulations that can also potentially play a role in reducing hours of work. Countries often set regulations about normal work hours (e.g., 40 hours in the US), premium for overtime work (50% in the US), night work, or work on holidays/week-ends. Countries can also mandate paid leave and vacation or maximum hours per day or week. The World Bank has compiled a database, Employing Workers, covering work regulations by country. Drawing on this database, we use 12 variables on regulations of working hours and create a single index from 0 to 1 using principal component analysis. Such regulations generally do not apply to the self-employed (e.g., family farm workers), and are typically enforced only on formal workers with much weaker enforcement among informal workers. Therefore, the regulations matter only to the extent that the formal sector is large. Hence, we use two variables in our regression analysis: the regulations index and the fraction of informal workers.[43] We focus on the cross-country analysis because the World Bank regulations data have only limited panel dimension.[44]

Table 7 Panel B presents the results of adding the regulation index and the fraction of informal workers to the tax variables. The first row repeats the labor tax elasticity estimates from Table 6; the second row presents the elasticity estimates when adding the two variables on regulations.[45] Two results are worth pointing out.

First, informal employment is positively correlated with hours of work while the regulation index in negatively correlated with hours of work. These coefficients are generally strongly significant and large in magnitude. For example, for all adults, moving from a zero informality share (as in richer countries) to a 100% informality share (this share is around 90% in the poorest countries) increases hours of work per adult by 52 log points (about 70%). Going from no regulations to the strictest regulations (as in France) reduces hours of work by 24 log points. Appendix Figure A.23 visually depicts the positive correlation between hours and informality

[43] Appendix Figures A.22 and A.23 depict the rate of informality and the regulation index by country.

[44] The historical data cover only 2004-2020 with relatively small changes within countries during that time period.

[45] In all these regressions, we also include the full set of variables that were included in Table 6.

(panel (a)) and negative correlation between hours and regulations (panel (b)). These results are consistent with studies in the OECD context showing that regulations are associated with lower working hours (Causa (2008) provides an analysis for OECD countries and a review of this literature).

Second, adding these two variables dramatically reduces the labor tax elasticity of hours of work. For all columns, the elasticity becomes small and generally insignificant. Comparing with Panel A, we can see that regulations reduce the elasticity much more dramatically than government spending.[46] This suggests that labor taxes depress hours of work not primarily through income and substitution effects but rather because they correlate with the development of formal work and the substantial regulations of working hours that come with it.[47]

7. Conclusion

This paper has used labor force surveys across countries to build a comprehensive and consistent hours worked database of 157 countries covering 97% of the world population in cross-section. This allows us to build the first truly global hours worked statistics by age (15+) and gender. We have also constructed long time series for 79 countries allowing us to study evolutions over time within countries. One output of our work is a publicly posted dataset cross-country and time series that provides a rich set of hours worked and demographic statistics disaggregated by fine 5 year age groups cross gender which allows researchers to reproduce all our results and further explore the database.

We have obtained a number of substantive results. Global hours worked are very strongly bell-shaped with age. Female hours worked is 35% of the total. Hours worked of the young (age 15-19) and elderly (age 60+) falls with national GDP per capita which can be explained by the

[46] We have also ran regressions including both regulations and government spending variables. The labor tax elasticity generally remains insignificant. The government spending variables are not significant while the labor regulation variables do not change much and remain highly significant.

[47] In appendix Table A.4, we regress log-hours on all the key determinants we have considered: GDP per adult, taxes, government spending, informality and regulations, school attendance, and sectoral composition. In this large regression, most of the coefficients are similar to those we documented in more specific regressions discussed in the main text. The adjusted R-squares are also very large around 80% showing that a fairly small number of variables can explain most of the cross-country regression. In particular, GDP per adult is consistently positively associated with hours of work with an elasticity around .1-.3.

development of schooling attendance and pension coverage. Prime-age (20-59) hours worked are bell-shaped for men with national GDP per capita while they are increasing for women. The fall in male hours worked in middle-to-higher income countries is driven by reduced hours per worker and is quantitatively offset by increases in female employment rates. This is true both in cross-sectional international comparisons and overtime within countries.

Labor taxes—but not consumption taxes—are strongly negatively correlated with hours worked both in international comparisons and over time within countries. Controlling for government transfers only partly reduces the link between labor taxes and hours. This suggests that the income effects of government transfers cannot fully explain the negative correlation between labor taxes and hours of work. In contrast, controlling for employment regulations and informality almost entirely eliminates this link, suggesting that the development of the social state and the large labor taxes that funds it is correlated with the development of labor regulations and that these regulations are the key driver for reducing hours of work. Together, our findings suggest that cultural and social choices often encoded in public policy powerfully shape hours worked over and above pure economic development.

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Table 1: Global Hours Worked

		By Gender		By Age		
	All	Men	Women	Young	Prime-Aged	Elderly
Hours per Adult	24.1	31.4	16.9	7.4	30.3	10.9
Hours per Worker	43.4	45.6	39.0	38.7	44.1	38.6
Employment	57.6%	69.9%	45.5%	21.1%	70.3%	31.9%

Notes. This table reports global weekly hours worked statistics by gender and broad age groups for all adults (aged 15+). For each country with data (see Figure A.2), we use the most recent labor force survey available (generally 2022 or 2019 as we exclude COVID years whenever possible, see appendix Table A.5). Estimates are weighted by adult population size in each country to be representative. The sample includes 157 countries and covers 97% of the world adult population. Hours of work are defined in almost all countries as actual hours of work (rather than usual) in the reference week across all jobs including self-employment that contributes to GDP (non-market home produced services such as cleaning, cooking, child care, etc. are hence excluded). The employment rate is defined as the fraction of adults having a job (including those on vacation or sick leave). Hours per adult are decomposed into the product of hours per worker and the employment rate. Young: aged 15-19. Prime-age: aged 20-59. Elderly: aged 60+.

Table 2: Hours Worked by the Young (15-19)

	(1)	(2)	(3)	(4)
Log GDP Per Adult	-1.596**		0.871**	2.569***
	(0.629)		(0.386)	(0.590)
Young School Attendance		-25.251***	-29.397***	-29.853***
		(2.866)	(3.276)	(3.670)
Employment: Agriculture				9.031**
				(3.806)
Employment: Manufacturing				0.712
				(7.277)
Mean DepVar	7.0	7.0	7.0	7.0
N	143	143	143	143
Adjusted R2	0.13	0.60	0.62	0.68

Notes. This table reports results from cross-country regressions of average hours of work of the young (aged 15-19) on various determinants. Regressions are weighted by adult population size in each country to be representative. The sample includes 138 countries where all the determinants are available and covers 91% of the world adult population. Young school attendance is the fraction (between 0 and 1) of young adults aged 15-19 attending school. Employment: agriculture (resp. manufacturing) is the share of workers in agriculture (resp. manufacturing) countrywide (including all workers). Hours worked of the young is negatively correlated with log GDP per adult (column 1). School attendance of the young is the main determinant for their hours worked (cols. 2-4) and fully explains the negative relationship with GDP (cols. 3-4).

Table 3: Hours Worked by the Elderly (60+)

	(1)	(2)	(3)	(4)	(5)
Log GDP Per Adult	-5.204***			1.806	-0.180
	(1.389)			(1.657)	(1.362)
Pension Spending		-33.783*		-8.229	-45.382*
		(20.158)		(24.682)	(23.373)
Elderly Population Share		-51.855***		-40.505*	-14.446
		(17.778)		(21.139)	(15.019)
Pension Coverage			-17.260***	-12.796***	-6.428**
			(2.882)	(3.723)	(2.704)
Employment: Agriculture					-4.517
					(7.973)
Employment: Manufacturing					-43.522***
					(9.578)
Mean DepVar	11.5	11.5	11.5	11.5	11.5
N	91	91	91	91	91
Adjusted R2	0.38	0.52	0.61	0.66	0.76

Notes. This table reports results from cross-country regressions of average hours of work of the elderly (aged 60+) on various determinants. Regressions are weighted by adult population size in each country to be representative. The sample covers 91 countries for which all the variables are available. It covers 63% of the world adult population. Pension coverage is defined as the fraction of adults aged 60+ living in a household where at least one person receives a pension. Pension spending is government pension spending relative to GDP. Elderly population share is the share of the population aged 60+. Employment: agriculture (resp. manufacturing) is the share of workers in agriculture (resp. manufacturing) countrywide. Pension coverage is the main determinant of hours worked among the elderly (cols. 3-5) and fully explains the negative relationship with GDP (col. 4).

Table 4: Hours Worked by Prime-Age Women

	(1)	(2)	(3)	(4)
Log GDP Per Adult	3.575**		-1.241	2.654***
	(1.398)		(0.820)	(0.850)
Muslim/Hindu Population Share		-12.781***	-13.446***	-13.241***
		(1.302)	(1.232)	(1.670)
Former Communist Country		5.227***	5.019***	7.111***
		(0.914)	(0.931)	(1.656)
% Women Living with Young Children		-0.008	-4.486	-5.780*
		(4.019)	(4.893)	(3.259)
Employment: Agriculture				19.900***
				(4.257)
Employment: Manufacturing				-17.504
				(15.147)
Mean DepVar	21.7	21.7	21.7	21.7
N	136	136	136	136
Adjusted R2	0.13	0.76	0.77	0.84

Notes. This table reports results from cross-country regressions of average hours of work of prime-age women on various determinants. Regressions are weighted by adult population size in each country to be representative. The sample covers 132 countries for which all the variables are available. It covers 86% of the world adult population. Fraction living with young children is the fraction of prime-age women living in households with one or more children of age 0-5. A higher Muslim/Hindu population share reduces hours of work while being a formerly communist country increases hours of work. GDP per adult does not have a consistent effect on hours of work of prime-age women. The relation is positive without controls (column 1). It becomes negative with the three sociodemographic controls (column 3), and positive again when controlling for share of total (male+female) employment in agriculture and manufacturing (column 4).

Table 5: Hours of Work and GDP per Adult

Panel A: Cross Section

	(1) All Adults	(2) Prime-Aged Adults	(3) Prime-Aged Men	(4) Prime-Aged Women	(5) Young 15-19	(6) Elderly 60+
Log GDP Per Adult	-0.975	0.552	-2.192**	3.012**	-1.576***	-4.365***
	(0.634)	(0.701)	(1.027)	(1.309)	(0.599)	(0.889)
Mean DepVar	22.2	27.9	34.6	21.6	7.1	11.9
Rich-Poor Gap	-3.9	2.2	-8.8	12.0	-6.3	-17.5
N	157	157	157	157	155	157
Adjusted R2	0.03	0.00	0.11	0.09	0.13	0.36

Panel B: Panel Data

	(1) All Adults	(2) Prime-Aged Adults	(3) Prime-Aged Men	(4) Prime-Aged Women	(5) Young 15-19	(6) Elderly 60+
Log GDP Per Adult	-0.469	1.022***	-4.745***	6.139***	-7.600***	0.090
	(0.303)	(0.312)	(0.391)	(0.501)	(0.506)	(0.320)
Mean DepVar	21.3	27.6	34.9	20.6	7.3	8.0
Rich-Poor Gap	-1.9	4.1	-19.0	24.6	-30.4	0.4
N	2,027	2,027	2,027	2,027	1,991	2,027
Within R2	0.00	0.02	0.20	0.36	0.32	-0.00

Notes. This table reports regression results linking hours of work per adult and GDP per adult across countries in panel A and within countries and over time in panel B. Each column focuses on a specific group of individuals. All adults: all adults aged 15+. Prime-age: aged 20-59. Elderly: aged 60+. Panel A includes 97% of the world population from 157 countries using the most recent labor force survey available (generally 2022 or 2019 as we exclude COVID years whenever possible, see appendix Table A.5). Regressions are weighted by adult population size in each country to be representative. Panel B includes a subset of 79 countries for which we have longer time series. Regressions in Panel B include country fixed effects. In both the cross-section and the panel analysis, there is no strong link between log GDP and hours per adult or hours per prime-age adult. Hours of work of prime-age men are negatively related to GDP per adult while hours of work of prime-age women are positively correlated. The two effects offset each other. Hours of work of the young decline with GDP per adult, particularly so in the panel. Hours of work of the elderly decline with GDP per adult in the cross section but not in the panel.

Table 6: Elasticities of Hours Worked with Respect to Net-of-Tax Rates

A. Cross-country regressions

	Hours Per Adult	Hours Per Worker	Employment Rate	Prime Aged	Prime-Aged Men	Prime-Aged Women
$\log 1-\tau(L)$	1.272***	0.767***	0.489***	0.947***	0.837***	1.204***
	(0.181)	(0.216)	(0.160)	(0.166)	(0.160)	(0.369)
$\log 1-\tau(K)$	0.169	0.168**	-0.029	0.158	0.147	0.200
	(0.110)	(0.069)	(0.121)	(0.107)	(0.106)	(0.252)
$\log 1/(1+\tau(C))$	-0.891*	-0.804	0.276	-0.932**	-1.080**	-1.005
	(0.477)	(0.507)	(0.468)	(0.441)	(0.466)	(1.531)
Log GDP Per Adult	0.074**	0.066**	0.011	0.097***	0.074***	0.148*
	(0.029)	(0.029)	(0.032)	(0.027)	(0.024)	(0.075)
Muslim/Hindu Share	-0.240***	-0.013	-0.249***	-0.233***	0.058	-0.897***
	(0.053)	(0.068)	(0.037)	(0.054)	(0.055)	(0.111)
N	126	126	126	126	126	126
Adjusted R2	0.58	0.40	0.37	0.50	0.55	0.63

B. Panel analysis

	Hours Per Adult	Hours Per Worker	Employment Rate	Prime Aged	Prime-Aged Men	Prime-Aged Women
$\log 1-\tau(L)$	0.366***	0.347***	0.031	0.182**	0.365***	-0.037
	(0.087)	(0.047)	(0.061)	(0.078)	(0.065)	(0.152)
$\log 1-\tau(K)$	0.175***	0.151***	0.010	0.134***	0.040*	0.203***
	(0.031)	(0.017)	(0.022)	(0.026)	(0.023)	(0.055)
$\log 1/(1+\tau(C))$	-0.186	-0.015	-0.035	-0.311	-0.214	-0.337
	(0.228)	(0.128)	(0.169)	(0.206)	(0.204)	(0.386)
Log GDP Per Adult	0.120***	0.044***	0.076***	0.113***	0.175***	0.010
	(0.027)	(0.015)	(0.023)	(0.023)	(0.021)	(0.041)
Year	-0.002***	-0.002***	-0.000	-0.001***	-0.006***	0.007***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
N	1882	1882	1882	1882	1882	1882
Adjusted R2	0.90	0.89	0.90	0.85	0.90	0.93

Notes. This table reports results of regressions of various measures of hours worked (across columns) on average tax rates on labor $\tau(L)$, capital $\tau(K)$, and consumption $\tau(C)$ across countries in panel A and in panel analysis with country fixed effects in panel B. Hours worked are measured in log and tax rates in the log net-of-tax rate so that estimates can all be interpreted as elasticities of hours worked with respect to net-of-tax rates. Regressions are weighted by adult population size in each country to be representative. The sample in panel A covers 126 countries and 92% of the world adult population. In Panel A, we include the Muslim/Hindu population share as it strongly affects female hours of work. In Panel B, we add a time trend to each regression to absorb the secular increase in female hours—and corresponding decrease for men. Labor tax rates depress hours of work especially so in the cross section but consumption tax rates do not. The elasticity of hours with respect to net-of-tax labor tax rates is generally much higher than the elasticity of hours with respect to GDP per adult.

Table 7: Elasticities of Hours Worked: Taxes vs. Transfers and Regulations

A. Transfers

	Hours Per Adult	Hours Per Worker	Employment Rate	Prime Aged	Prime-Aged Men	Prime-Aged Women
Labor Taxes: $\log(1-\tau(L))$						
Without Spending Controls	1.272***	0.767***	0.489***	0.947***	0.837***	1.204***
	(0.181)	(0.216)	(0.160)	(0.166)	(0.160)	(0.369)
With Spending Controls	0.916***	0.930***	0.158	0.732***	0.873***	0.354
	(0.251)	(0.241)	(0.217)	(0.221)	(0.197)	(0.483)
Public Spending						
Social Protection/GDP	-0.006	0.014*	-0.011	-0.001	0.005	-0.019
	(0.009)	(0.007)	(0.009)	(0.008)	(0.008)	(0.017)
Health/GDP	-0.030**	-0.028*	-0.009	-0.028**	-0.013	-0.053***
	(0.013)	(0.016)	(0.007)	(0.012)	(0.013)	(0.019)
Other Expenditure/GDP	0.005*	0.006*	-0.001	0.008***	0.006*	0.017**
	(0.003)	(0.003)	(0.003)	(0.002)	(0.004)	(0.008)
Adjusted R2	0.64	0.47	0.39	0.58	0.57	0.68

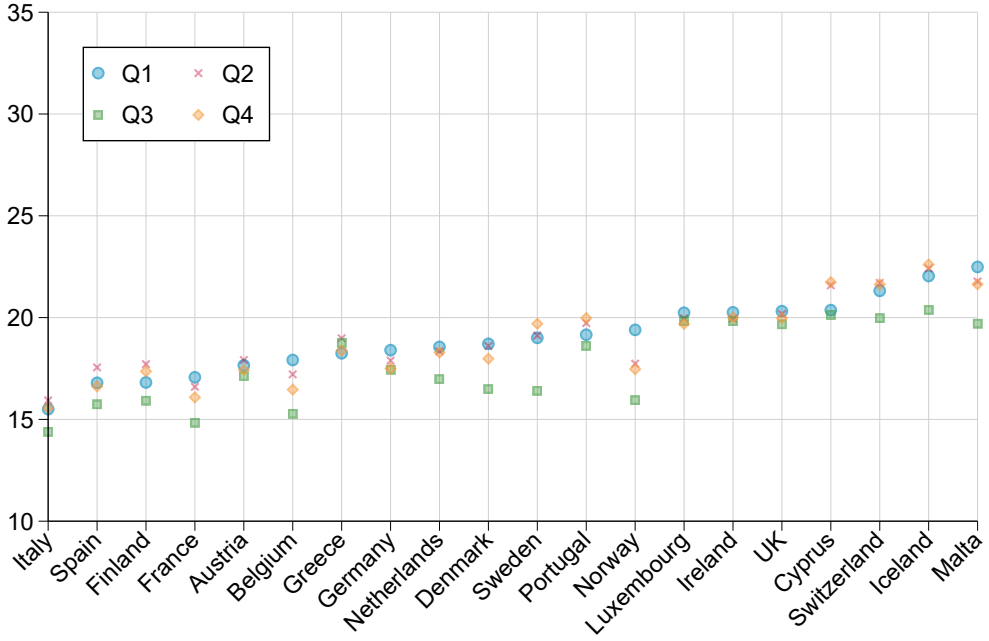
B. Regulations

	Hours Per Adult	Hours Per Worker	Employment Rate	Prime Aged	Prime-Aged Men	Prime-Aged Women
Labor Taxes: $\log(1-\tau(L))$						
Without Regulations Controls	1.272***	0.767***	0.489***	0.947***	0.837***	1.204***
	(0.181)	(0.216)	(0.160)	(0.166)	(0.160)	(0.369)
With Regulations Controls	0.397**	0.314**	0.081	0.130	0.145	-0.299
	(0.171)	(0.152)	(0.240)	(0.159)	(0.159)	(0.512)
Regulations						
Informal Employment	0.524***	-0.003	0.426***	0.425***	0.310***	1.048**
	(0.114)	(0.120)	(0.149)	(0.107)	(0.108)	(0.410)
Labor Regulations Index	-0.243***	-0.315***	0.013	-0.270***	-0.264***	-0.313
	(0.084)	(0.102)	(0.096)	(0.076)	(0.064)	(0.246)
Adjusted R2	0.71	0.54	0.42	0.66	0.68	0.68

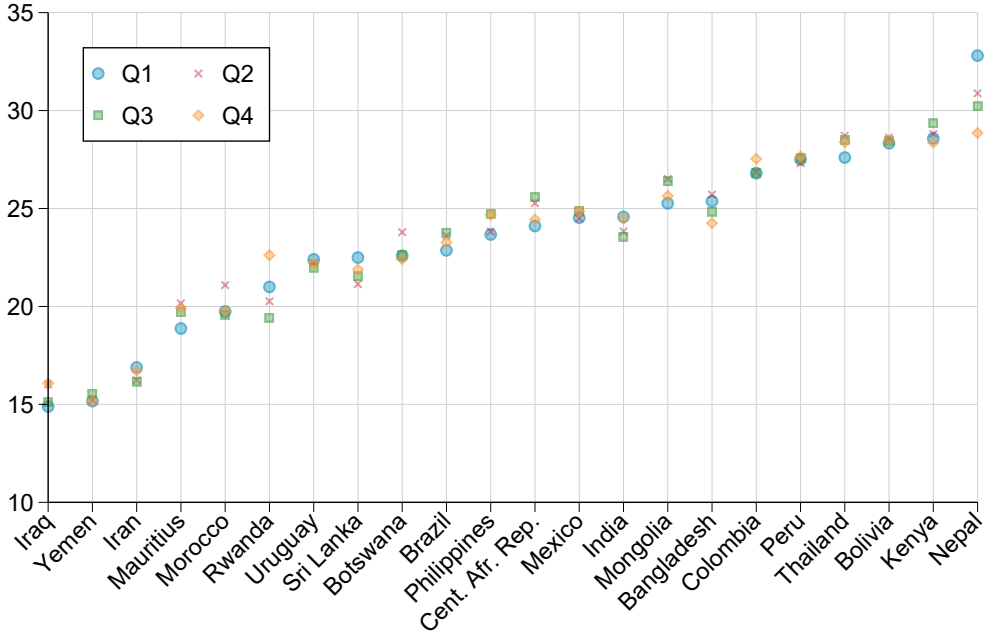
Notes. This table reports elasticities of hours worked with respect to the net-of-tax rate on labor income across countries as in Table 6A (first row in each panel) and how those elasticities are affected when we add controls for public spending components relative to GDP in Panel A and controls for working time labor regulations and the share of informal workers in Panel B. The modified elasticity is reported in the second row in each panel with subsequent rows displaying the coefficients on the newly added variables. The government spending variables are The working regulation index is constructed by combining the 12 variables on working hours regulations from the World Bank Employing Workers databased. All regressions are weighted by adult population size in each country to be representative. The sample covers 126 countries and 92% of the world adult population. In all these regressions, we also include the full set of variables that were included in Table 6, Panel A. Adding government spending reduces the elasticity of hours with respect to the net-of-labor tax rate slightly suggesting that traditional income effects from government spending cannot fully explain the large elasticities. In contrast, adding the working time regulations and share informal sharply reduces the elasticity. Working time regulations and the share of workers formal reduce hours of work.

Figure 1: Seasonality in Hours Worked in Western Europe and Developing Countries

(a) Western Europe



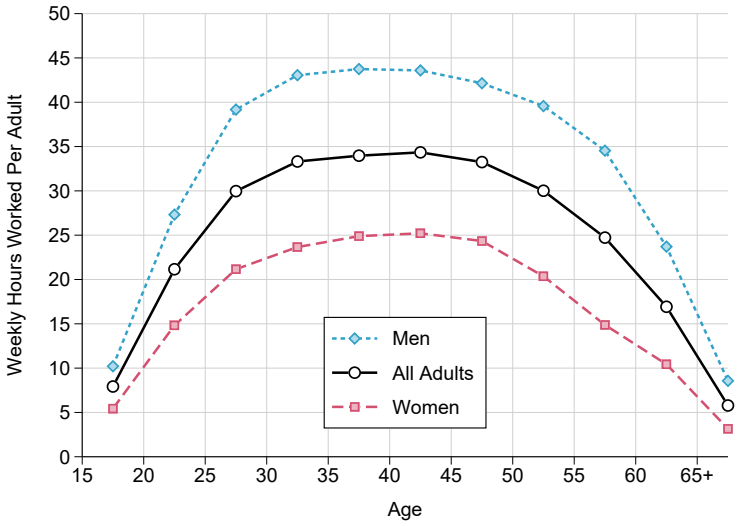
(b) Developing Countries



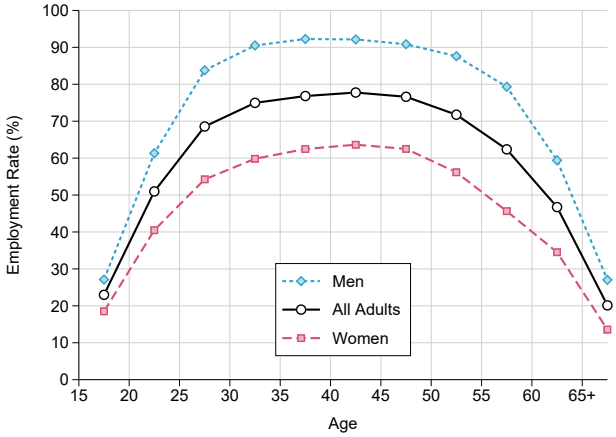
Notes: The figure depicts average hours of work per adult (aged 15+) by quarter in Western Europe (panel (a)) and developing countries (panel (b)), based on labor force surveys fielded over the entire year. Hours worked in Western Europe are generally lower in the third quarter, corresponding to the summer holidays. Seasonality is much smaller in developing countries. In both Western Europe and developing countries, cross-country variations in hours worked are similar across quarters, so that using data from a given quarter has limited impact on estimates of which countries have the highest and lowest hours.

Figure 2: Global Hours Worked by Age and Gender

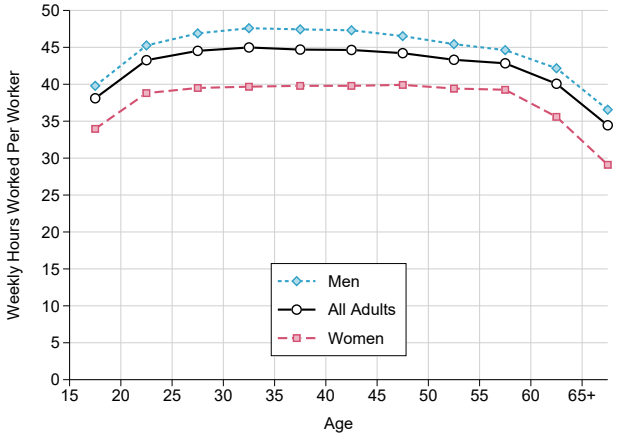
(a) Weekly Hours of Work per Adult



(b) Employment Rates



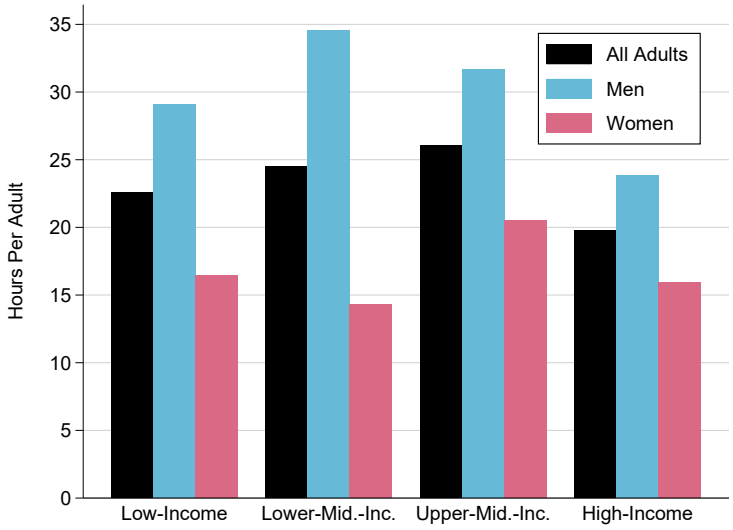
(c) Weekly Hours per Worker



Notes: The figure depicts global average weekly hours of work per adult (aged 15 and above) in panel (a), employment rates per adult in panel (b), and weekly hours of work per worker in panel (c) by gender and 5-year age groups 15-19, 20-24, ..., 60-64, and grouping together those aged 65+. For each country with data (see Figure A.2), we use the most recent labor force survey available (generally 2022 or 2019 as we exclude COVID years whenever possible, see appendix Table A.5). Estimates are weighted by adult population size in each country to be representative. The sample covers 97% of the world adult population. Hours of work are defined in almost all countries as actual hours of work (rather than usual) in the reference week across all jobs including self-employment that contribute to GDP (non-market home produced services such as cleaning, cooking, child care, etc. are hence excluded). The employment rate is defined as the fraction of the population having a job (including those on vacation or sick leave). Therefore, unconditional hours in panel (a) decompose into the product of employment rate in panel (b) and hours per worker in panel (c). Hours of work are lower among the young and the old and this is driven almost entirely by employment rates. The gender gap in hours worked is primarily driven by the employment rate extensive margin.

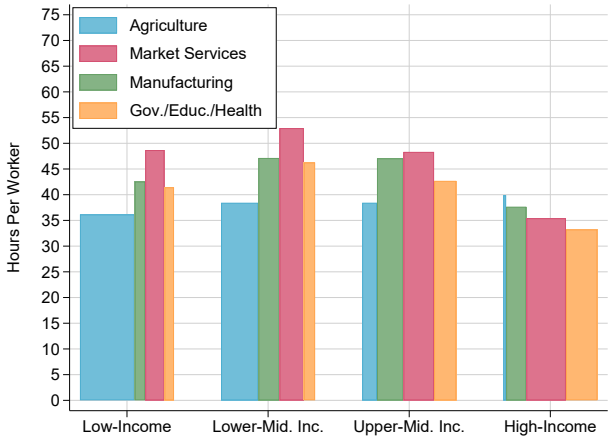
Figure 3: Hours Worked by Economic Development

(a) Gender Groups (Hours per Adult)



(b) Age Groups (Hours per Adult)

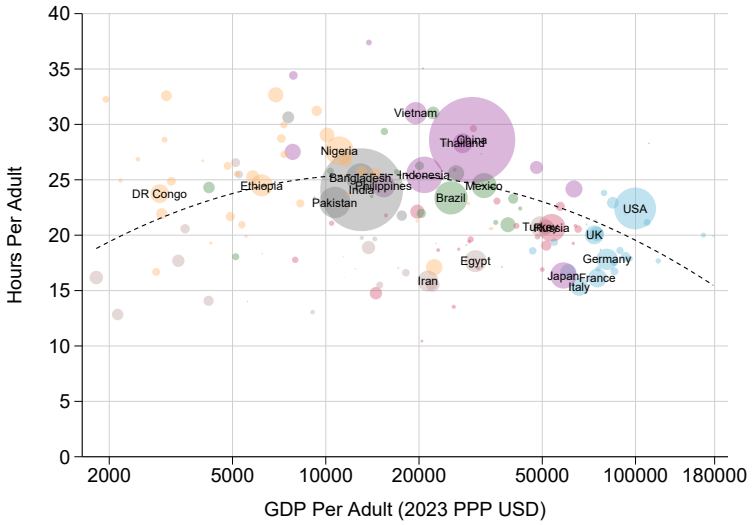
(c) Industry Groups (Hours per Worker)



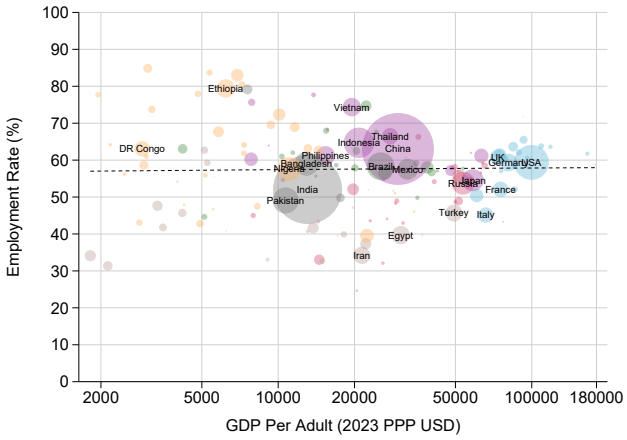
Notes: The figure depicts hours worked by stages of development using the World Bank grouping of countries as of 2023 available here. Estimates are weighted by adult population size in each country to be representative. The sample covers 97% of the world adult population. Panel (a) depicts hours of work per adult for all adults (black bars), men (blue bars), and women (pink bars). Panel (b) depicts hours of work per adult by age group: young (aged 15-19), prime-age (age 20-59), and elderly (age 60+). Panel (c) depicts hours of work per worker by industrial sector. In panels (b) and (c), the width of each bar is proportional to its population size to illustrate the enormous variations in the age structure and industrial composition by development status. Panel (a) shows that hours of work first increase modestly, and then decrease with economic development. Panel (b) shows that the same pattern holds for prime-age hours of work. In contrast, hours of work for the young and especially the elderly decrease with economic development. Panel (c) shows that hours per worker first increase slightly and then decrease sharply in all sectors except in agriculture where they increase slightly even for richer countries.

Figure 4: Hours Worked among All Adults (Aged 15+) by Country Income

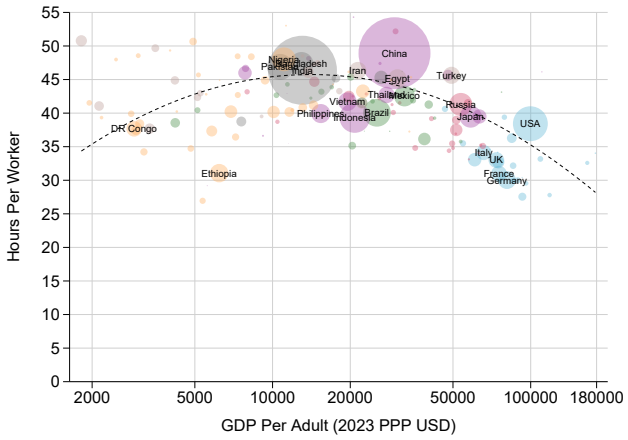
(a) Weekly Hours per Adult



(b) Employment Rate



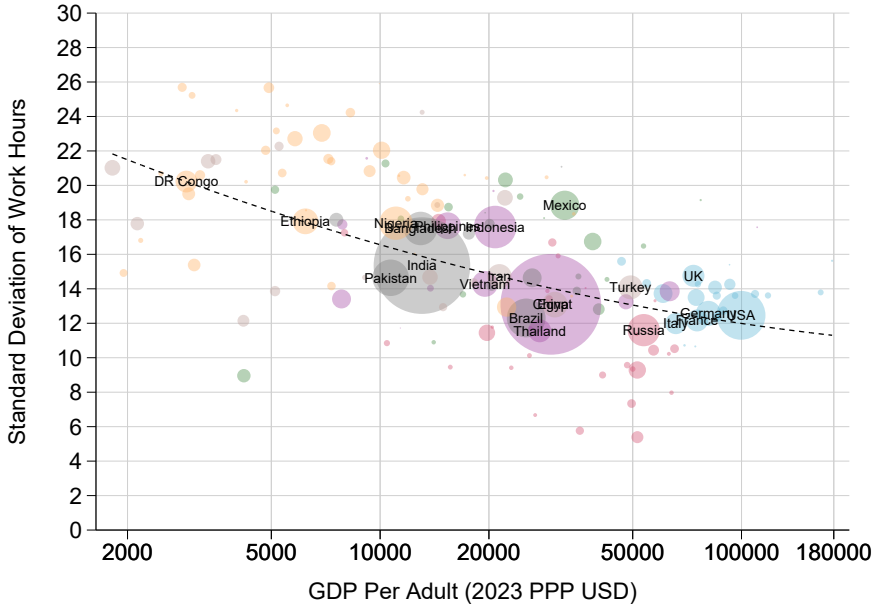
(c) Weekly Hours per Worker



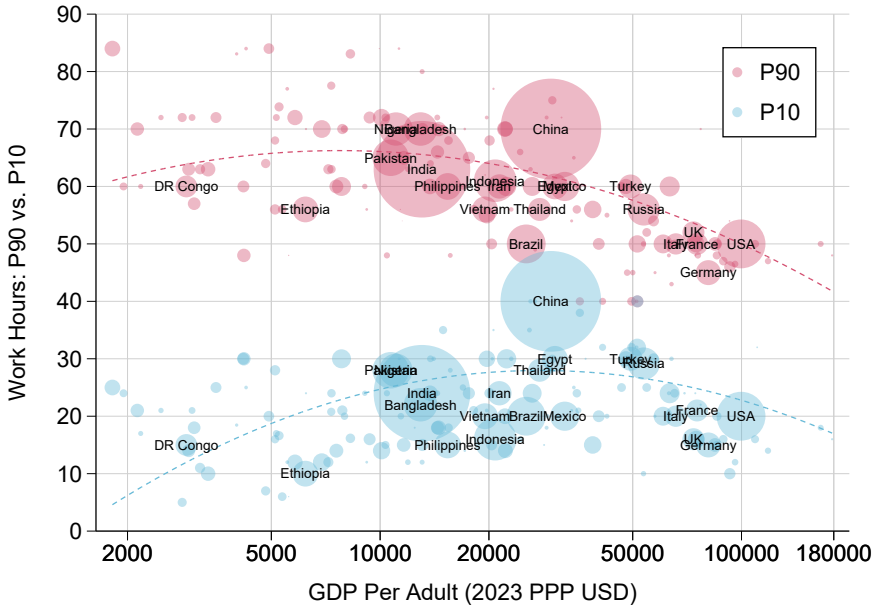
Notes: The figure depicts average weekly hours of work per adult (aged 15+) in panel (a), employment rates per adult in panel (b), and weekly hours of work per worker in panel (c), by country ranked by log GDP per adult in 2023 PPP USD. For each country, we use the most recent labor force survey available (generally 2022 or 2019 as we exclude COVID years whenever possible, see appendix Table A.5). Each country's circle's area is proportional to its adult population; the largest countries' names are depicted. Colors correspond to world regions as depicted in Figure A.2. The best quadratic fit of the weighted circles is represented by the dashed curve. Panel (a) shows a bell shape of hours of work per adult with development. Panel (b) shows overall stability of the employment rate with development and panel (c) shows a bell shape of hours per worker, with a substantial decline for higher income countries.

Figure 5: Variance in Hours of Work per Worker within Countries

(a) Standard Deviation in Weekly Hours per Worker



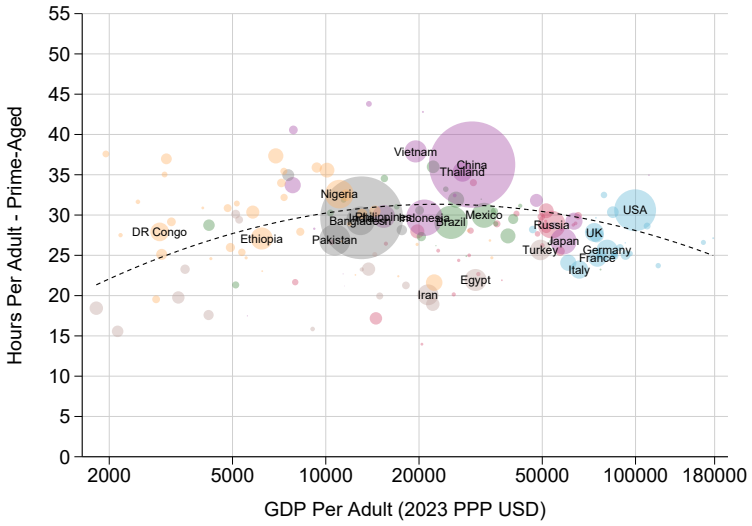
(b) 10th and 90th Percentiles of Hours per Worker



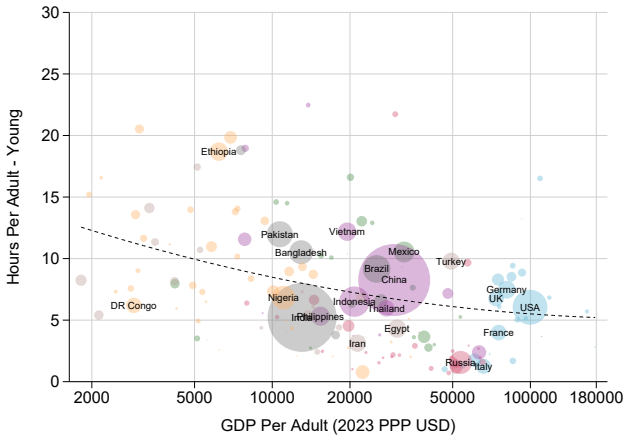
Notes: The figure depicts the standard deviation in weekly hours of work per worker in panel (a), and the 10th and 90th percentiles (P10 and P90) of weekly hours of work per worker in panel (b), by country ranked by log GDP per adult in 2023 PPP USD. For each country, we use the most recent labor force survey available (generally 2022 or 2019 as we exclude COVID years whenever possible, see appendix Table A.5). Each country's circle's area is proportional to its adult population; the largest countries' names are depicted. Colors in panel (a) correspond to world regions as depicted in Figure A.2. The best quadratic fit of the weighted circles is represented by the dashed curve. Panel (a) shows a clear decline in the standard deviation of hours of work per worker with development. Panel (b) also shows a clear decline in the gap between the 90th and 10th percentiles of hours with 90th percentile falling sharply for richer countries and the 10th percentile increasing among poorer countries.

Figure 6: Hours of Work per Adult by Country and Age Groups

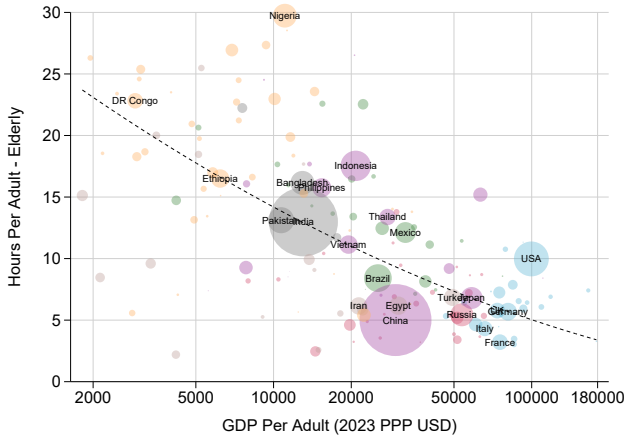
(a) Prime-Age Adults (Aged 20-59)



(b) Young (Aged 15-19)



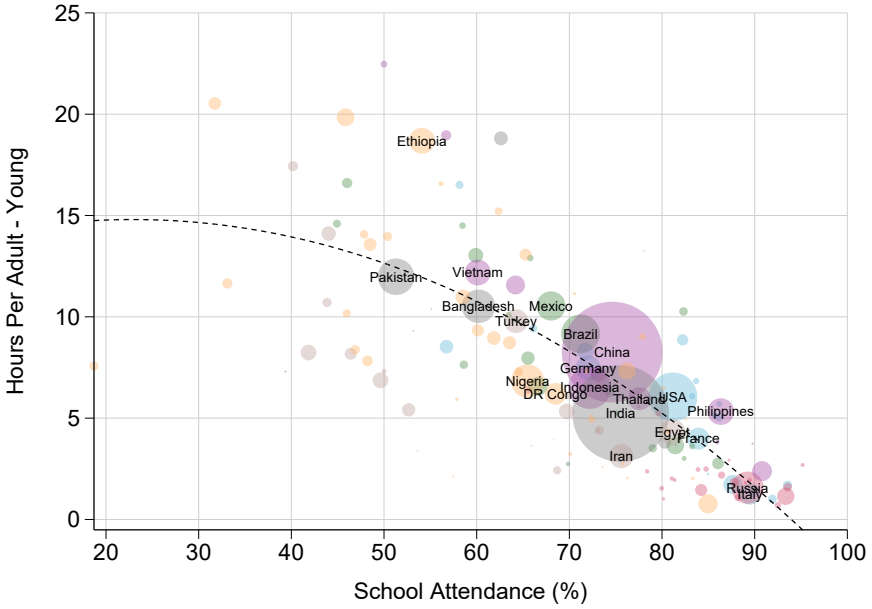
(c) Elderly (Aged 60+)



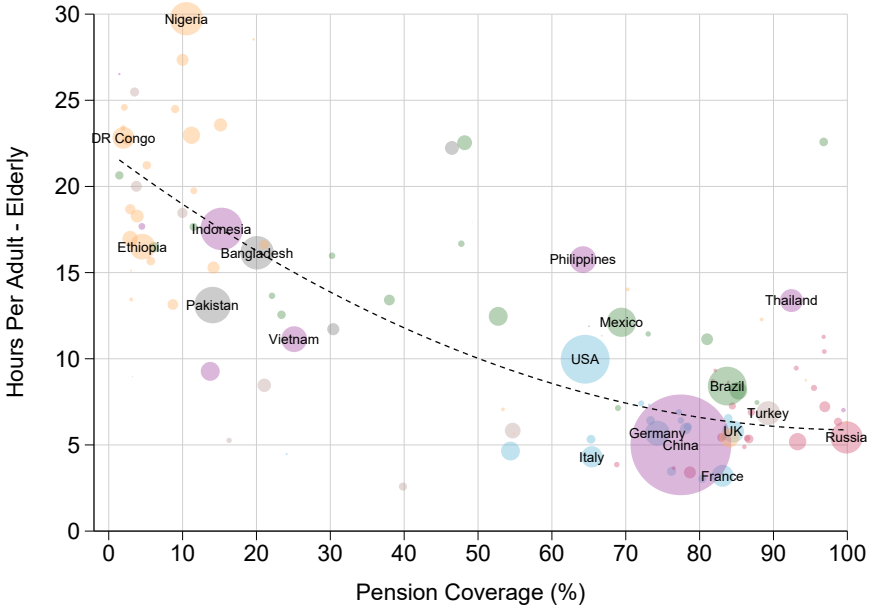
Notes: The figure depicts average weekly hours of work per adult for prime-age adults (aged 20-59) in panel (a), for the young (aged 15-19) in panel (b), and for the old (aged 60+) in panel (c) by country ranked by GDP per adult in 2023 PPP USD. For each country, we use the most recent labor force survey available (generally 2022 or 2019 as we exclude COVID years whenever possible, see appendix Table A.5). Each country's circle's area is proportional to its adult population; the largest countries' names are depicted. Colors correspond to world regions as depicted in Figure A.2. The best quadratic fit of the weighted circles is represented by the dashed curve. Panel (a) shows a weak inverted U-shape of prime-age hours of work with development. Panel (b) shows a moderate decline of hours of work of the young with development. Panel (c) shows a strong decline of hours of work of the elderly with development.

Figure 7: Schools and Pensions and Hours Worked by the Young and Elderly

(a) School Attendance and Hours of Work of the Young (15-19)



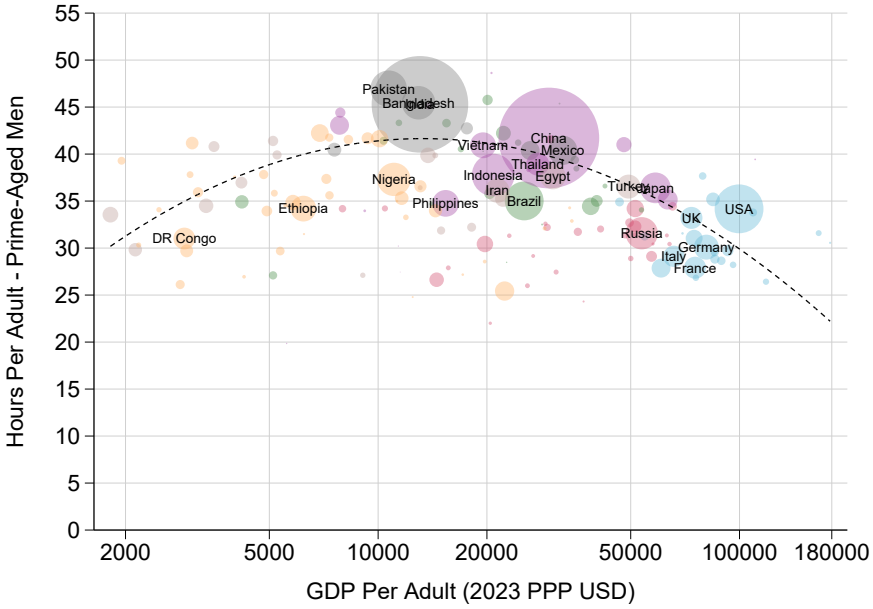
(b) Pension Coverage and Hours of Work of the Elderly (60+)



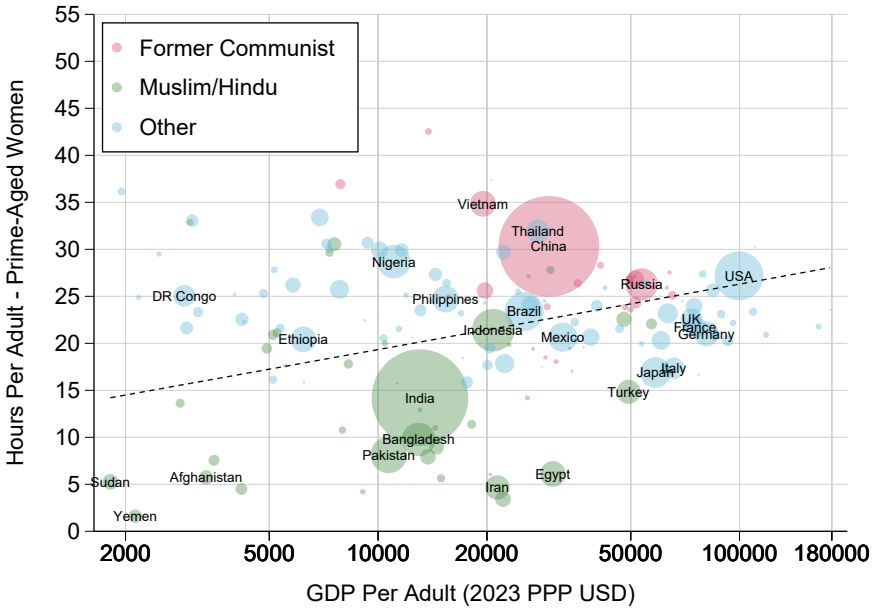
Notes: Panel (a) depicts the correlation between school attendance and hours of work for the young (age 15-19). Panel (b) depicts the correlation between pension coverage and hours of work for the elderly (age 60+). Pension coverage is defined as the fraction of the elderly living in a household where at least one person is receiving a pension. For each country, we use the most recent labor force survey available (generally 2022 or 2019 as we exclude COVID years whenever possible, see appendix Table A.5). Each country's circle's area is proportional to its adult population; the largest countries' names are depicted. Colors correspond to world regions as depicted in Figure A.2. The best quadratic fit of the weighted circles is represented by the dashed curve. Panel (a) shows a strong negative correlation between school attendance and hours of work of the young across countries (see Table 2 for regression analysis). Panel (b) shows a strong negative correlation between pension coverage and hours of work of the elderly across countries (see Table 3 for regression analysis).

Figure 8: Hours of Work per Adult by Country: Prime-Age Men and Women

(a) Men (Aged 20-59)



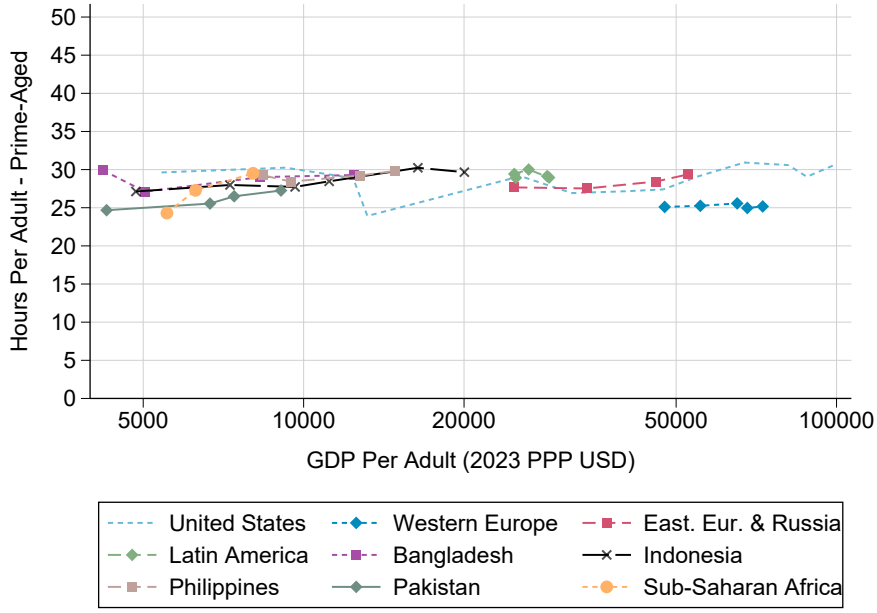
(b) Women (Aged 20-59)



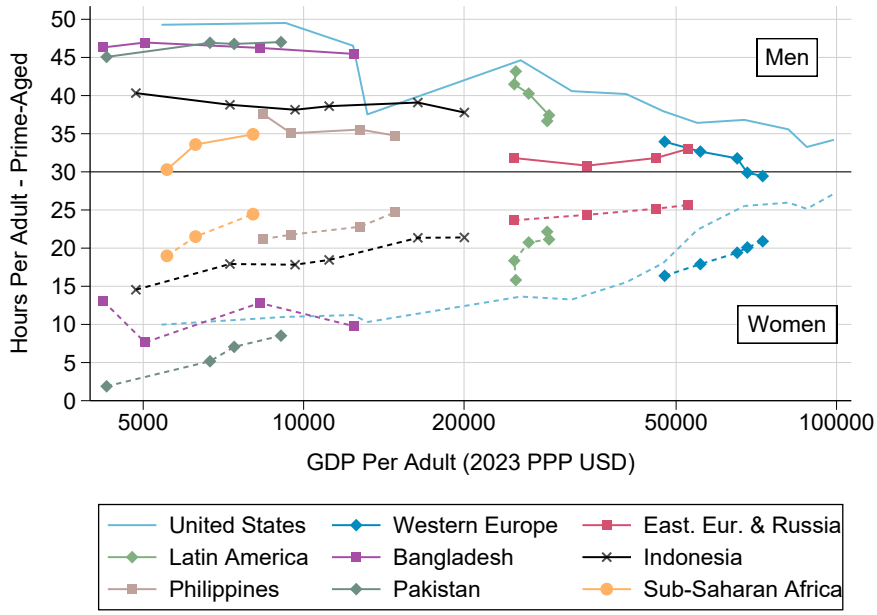
Notes: The figure depicts average weekly hours of work per adult for prime-age men in panel (a), and prime-age women in panel (b), by country ranked by GDP per adult in 2023 PPP USD. For each country, we use the most recent labor force survey available (generally 2022 or 2019 as we exclude COVID years whenever possible, see appendix Table A.5). Each country's circle's area is proportional to its adult population; the largest countries' names are depicted. In panel (a), colors correspond to world regions as depicted in Figure A.2. In panel (b), colors group countries in three groups most relevant for female hours worked: former communist countries in red, Muslim/Hindu countries in green, and other countries in blue. The best quadratic fit of the weighted circles is represented by the dashed curve. Panel (a) shows a pronounced inverted U-shape of male prime-age hours of work with development. Panel (b) shows a strong increase of female hours of work with development with particularly low hours among Muslim/Hindu countries (in green) and high hours among formerly communist countries (in red). If we exclude Muslim/Hindu countries, there is no relationship between GDP per adult and female prime-age hours worked (see appendix Figure A.15(a)).

Figure 9: Evolution of Hours of Work: Prime-Age Adults

(a) All Prime-Age Adults (Aged 20-59)



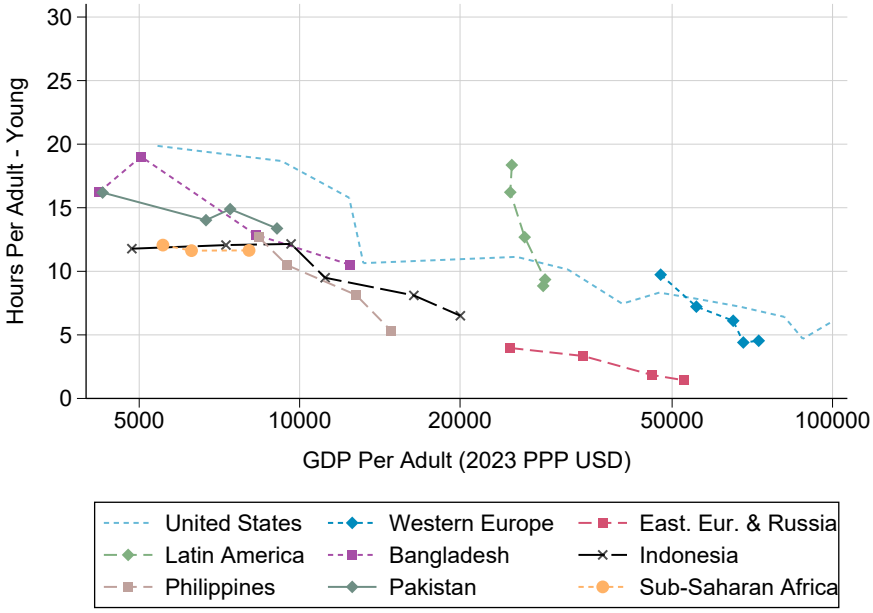
(b) Men vs. Women (Aged 20-59)



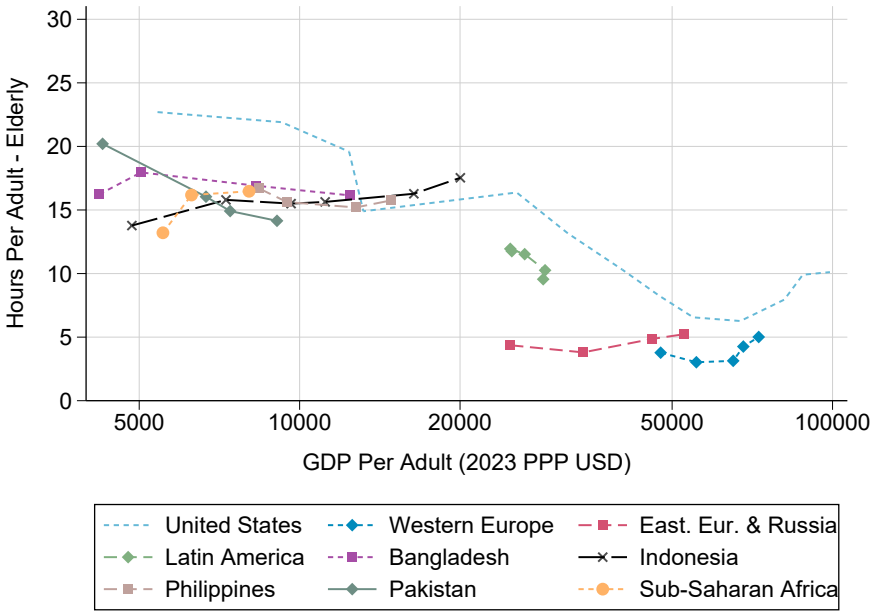
Notes: The figure depicts the evolution by decade of average weekly hours of work per adult for prime-age adults (age 20-59) in panel (a), and separately for prime-age men and prime-age women in panel (b) for regions and countries for which we have long time series available. Hours are plotted against country or region GDP per adult in the corresponding decade (expressed in 2023 PPP USD). In the series the last dot is the 2020s (excluding COVID years 2020-21), the next to last dot is the 2010s, etc. The long times series for the United States combines Current Population Survey data since 1962 along with Francis and Ramey (2009) data for 1900-1959. Panel (a) shows striking stability of prime-age hours of work overtime in each region/country. Panel (b) shows that hours of work generally increase for women while they symmetrically decrease for men explaining the stability in panel (a).

Figure 10: Evolution of Hours of Work: Young and Elderly

(a) Young (age 15-19)



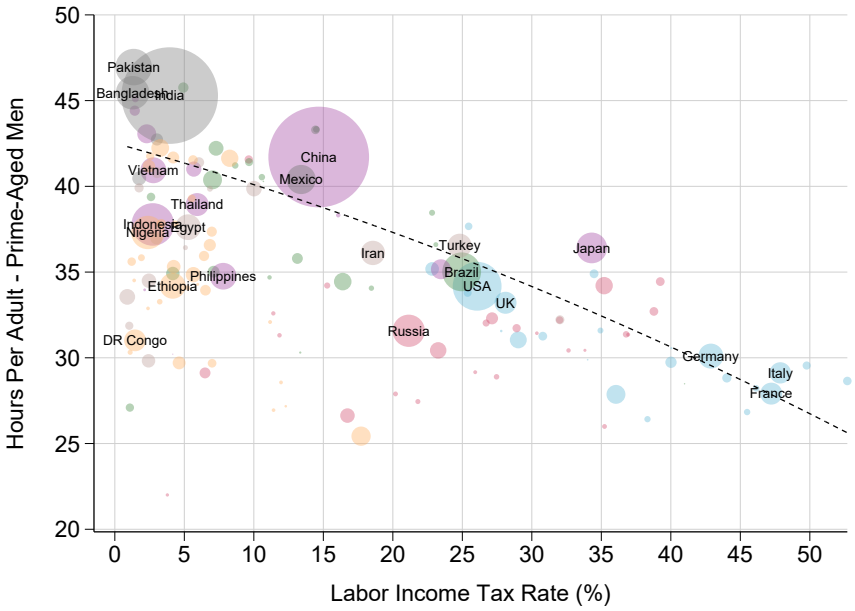
(b) Elderly (age 60+)



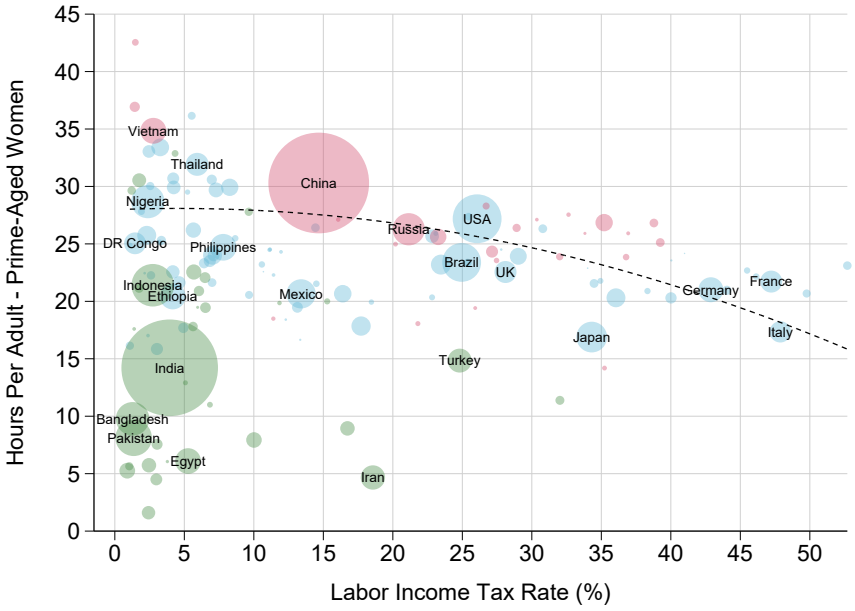
Notes: The figure depicts the evolution by decade of average weekly hours of work per adult for the young (age 15-19) in panel (a), and for the elderly (age 60+) in panel (b) for regions and countries for which we have long time series available. Hours are plotted against country or region GDP per adult in the corresponding period (expressed in 2023 PPP USD). In the series the last dot is the 2020s (excluding COVID years 2020-21), the next to last dot is the 2010s, etc. The long times series for the United States combines Current Population Survey data since 1962 along with Francis and Ramey (2009) data for 1900-1959. Panel (a) shows almost universal and often large declines in hours of work of the young over time within regions/countries. In contrast, panel (b) shows general stability in hours of work of the elderly over time within regions/countries (except for the US long time series and steep decline in 1900-1960s).

Figure 11: Labor Taxes and Hours of Work of Prime-Age Adults

(a) Men



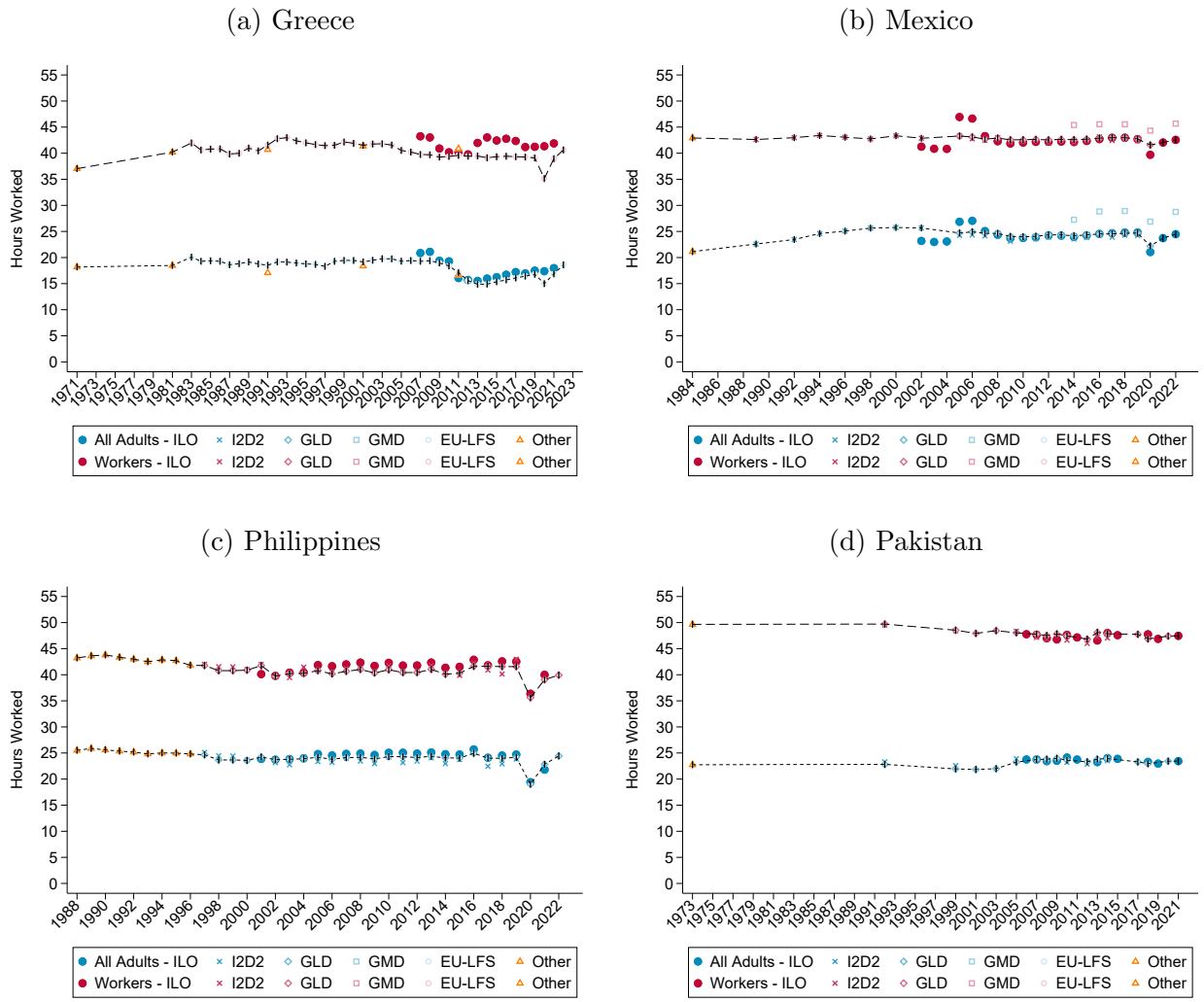
(b) Women



Notes: The figure depicts the correlation between average labor tax rates and hours of work per adult for prime-age men in panel (a) and prime-age women in panel (b). In each panel, we use the most recent labor force survey available (generally 2022 or 2019 as we exclude COVID years whenever possible, see appendix Table A.5). Each country's circle's area is proportional to its adult population; the largest countries' names are depicted. In panel (a), colors correspond to world regions as depicted in Figure A.2. In panel (b), colors group countries in three groups most relevant for female hours worked: former communist countries in red, Muslim/Hindu countries in green, and other countries in blue. The best quadratic fit of the weighted circles is represented by the dashed curve. For women, the best quadratic fit excludes Muslim/Hindu countries. Average labor tax rates are from Bachas et al. (2023). Panel (a) shows a strong negative correlation between labor tax rates and hours of work of prime-age men across countries. Panel (b) shows that this negative correlation also holds for women if we exclude Muslim/Hindu countries.

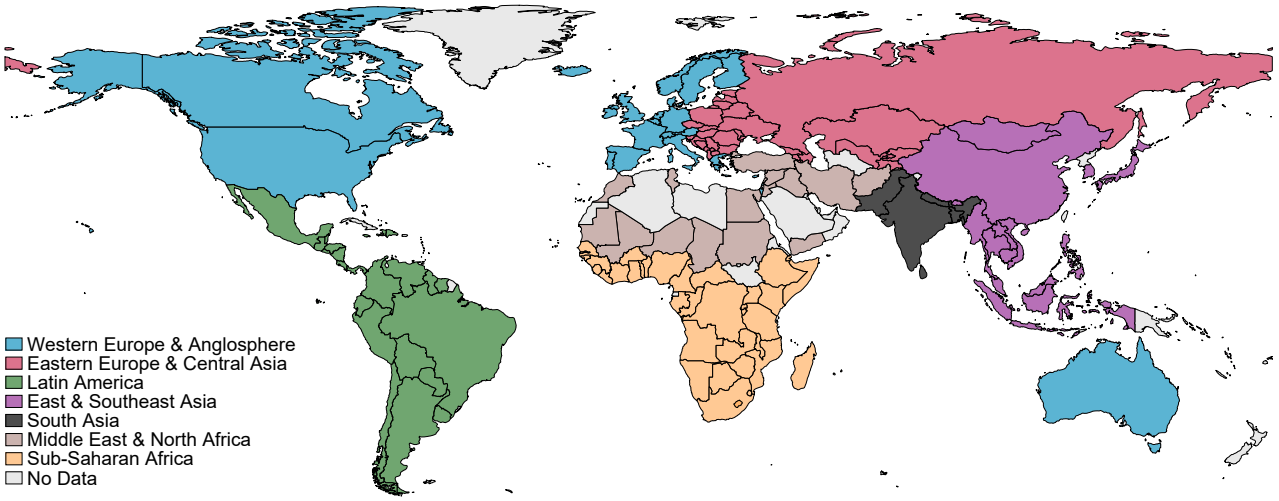
ONLINE APPENDIX

Figure A.1: Data Harmonization Examples



Notes: This figure plots the evolution of hours per adult (blue) and hours per worker (red) by data source in Greece, Mexico, the Philippines, and Pakistan, together with the selected series that are used in the final database (dashed lines). I2D2: World Bank I2D2 survey microdatabase. GMD: World Bank Global Monitoring Database. GLD: World Bank Global Labor Database. ILO: International Labor Organization labor force survey microdatabase. EU-LFS: European Union Labor Force Surveys. Other: other country-specific microdata sources (IPUMS International census microdata for Greece and Pakistan, country-specific household surveys harmonized by the authors for Mexico and the Philippines).

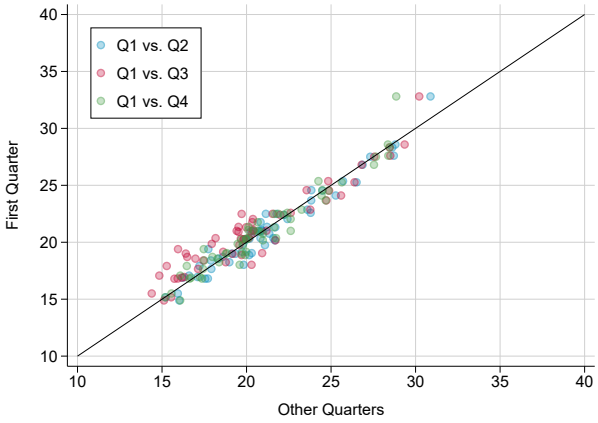
Figure A.2: Data Coverage and World Regions



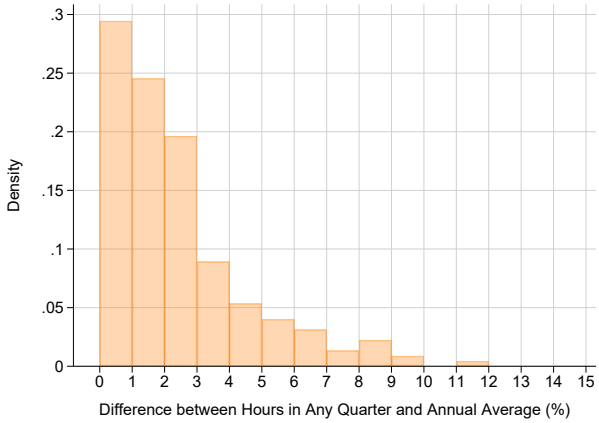
Notes: The figure depicts all the countries for which recent hours worked survey data are available for our analysis as well as the regions' breakdown that we will use. Relative to the usual partition of countries by regions, the region Middle East & North Africa is expanded to include Saharian/Sahel countries (Tchad, Niger, Mali, Mauritania) which are majority Muslim and similar to North African countries in their hours worked patterns. Our data cover 97% of the world population. Countries with no data are colored in light grey.

Figure A.3: Seasonality in Hours Worked

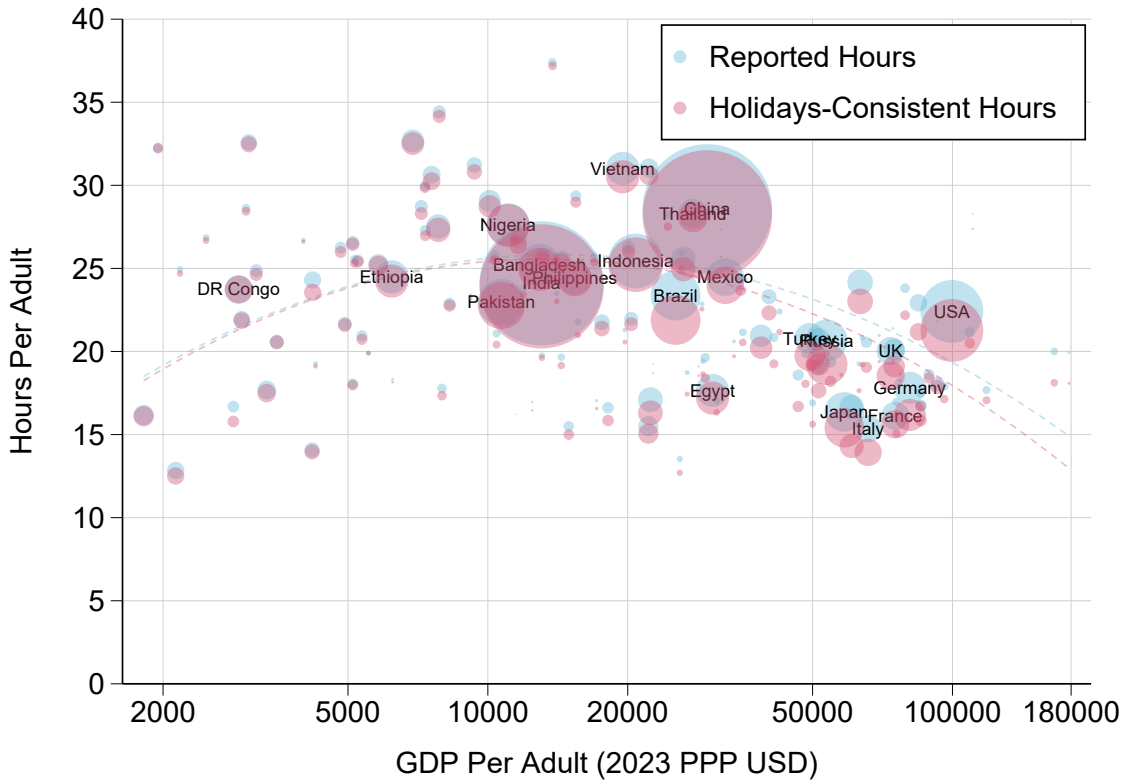
(a) Hours per Adult by Quarter



(b) Distribution of Quarterly Deviations in Hours Worked Relative to Annual Average



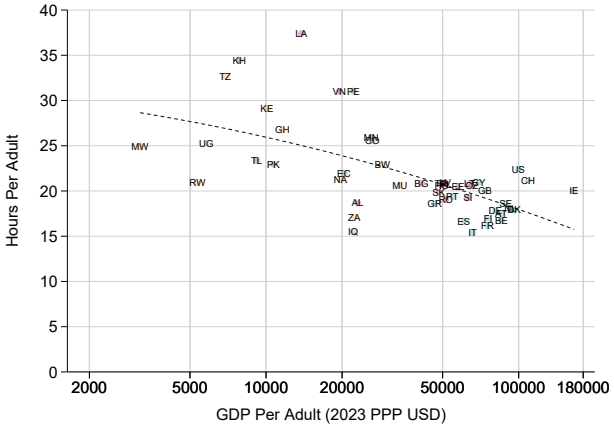
(c) Observed vs. Holidays-Consistent Hours Worked Over the Course of Development



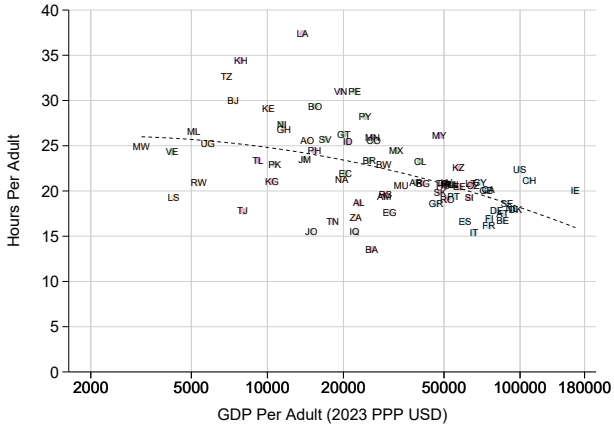
Notes: Panels (a) and (b) compare hours per adult observed across quarters, based on 224 nationally representative surveys that were fielded in 56 countries throughout the year and provide information on the quarter of interview. Panel (a) compares hours per adult aged 15+ in the first quarter versus other quarters across surveys. Panel (b) plots the distribution of quarterly deviations from annual average hours per adult observed across surveys. Panel (c) compares estimates of hours worked by country before (as in our benchmark estimates of Figure 4(a)) and after making the share of workers with zero hours consistent with legal paid annual leave time in each country (see main text). The best quadratic fit (with countries weighted by population) is depicted in dashed lines.

Figure A.4: Comparison with Bick, Fuchs-Schündeln, and Lagakos (2018)

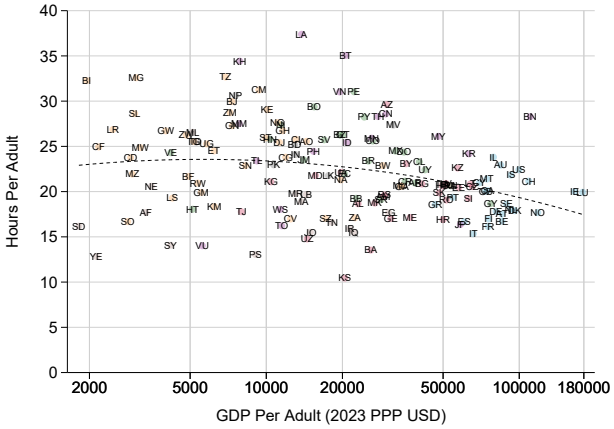
(a) Bick et al. (2018) Core Countries



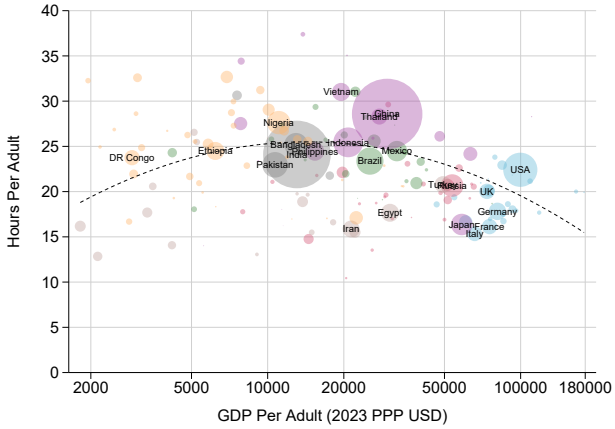
(b) Bick et al. (2018) Full Sample



(c) Our Sample



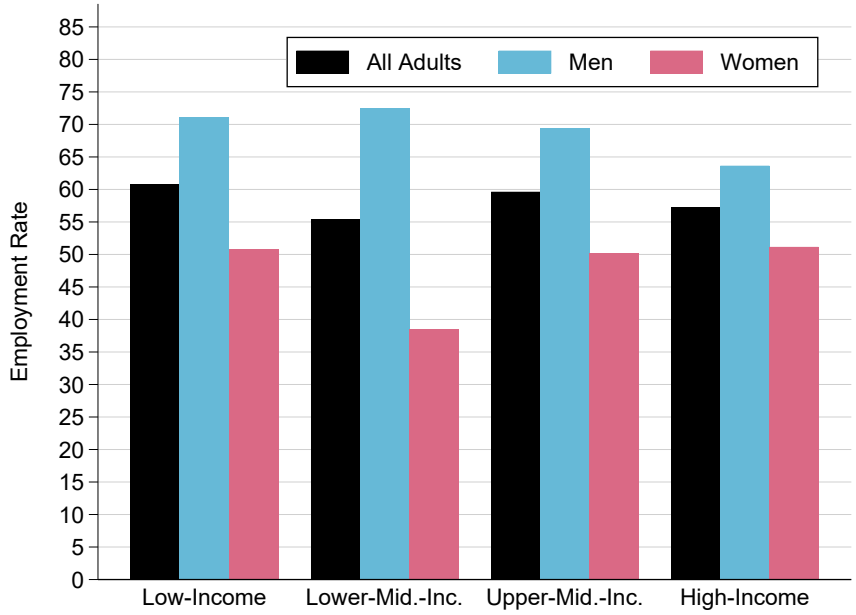
(d) Our Sample (Population-Weighted)



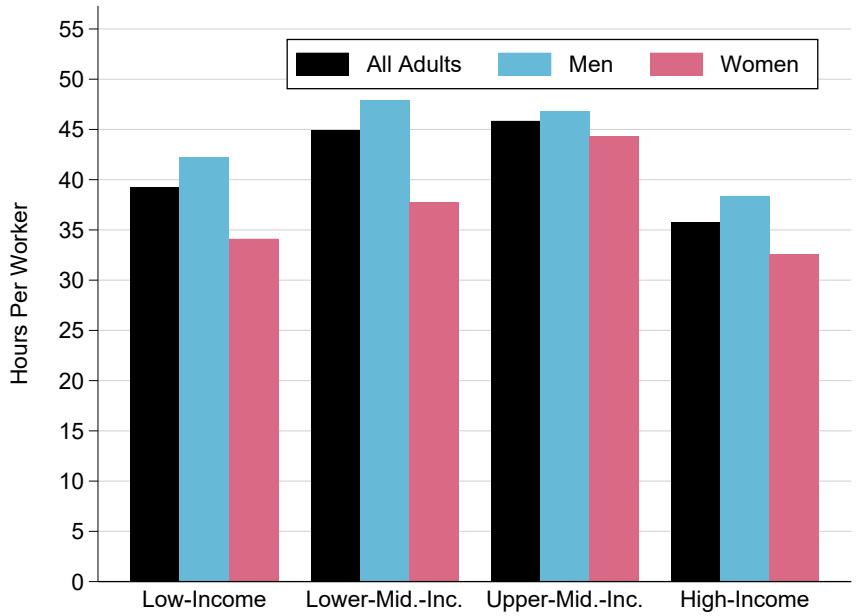
Notes: The figure compares weekly hours per adult over the course of development in the sample of countries studied by Bick, Fuchs-Schündeln, and Lagakos (2018) with our database on global hours worked. Panel (a) plots hours per adult versus GDP per adult in our database when restricting the analysis to the 49 core countries studied in Bick, Fuchs-Schündeln, and Lagakos (2018). Panel (b) does the same for the 80 countries covered in the Bick, Fuchs-Schündeln, and Lagakos (2018) full database. Panel (c) extends the analysis to all 157 countries in our data. Panel (d) adds population weights as in our benchmark Figure 4(a). In each panel, we depict the best quadratic fit in dashed line.

Figure A.5: Hours Worked by Gender and Development: Intensive vs. Extensive Margins

(a) Employment Rate



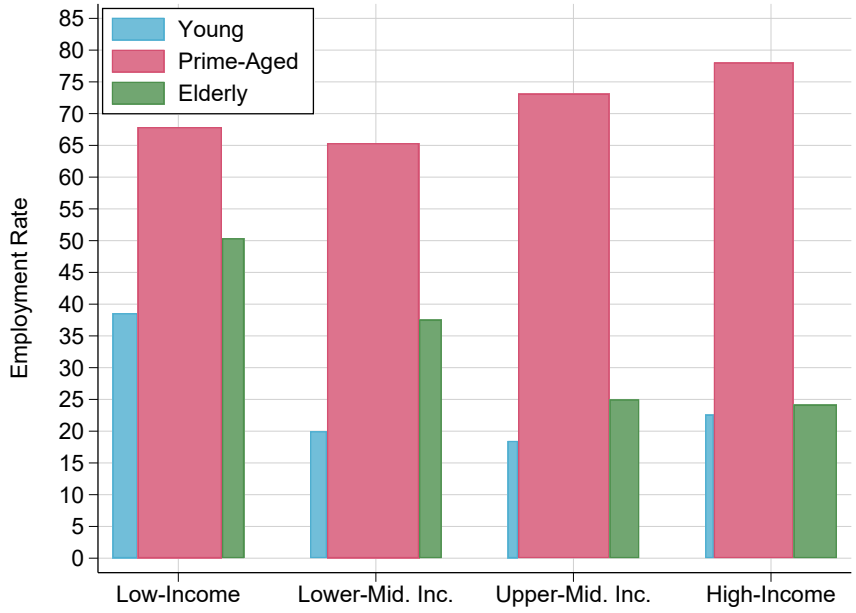
(b) Hours per Worker



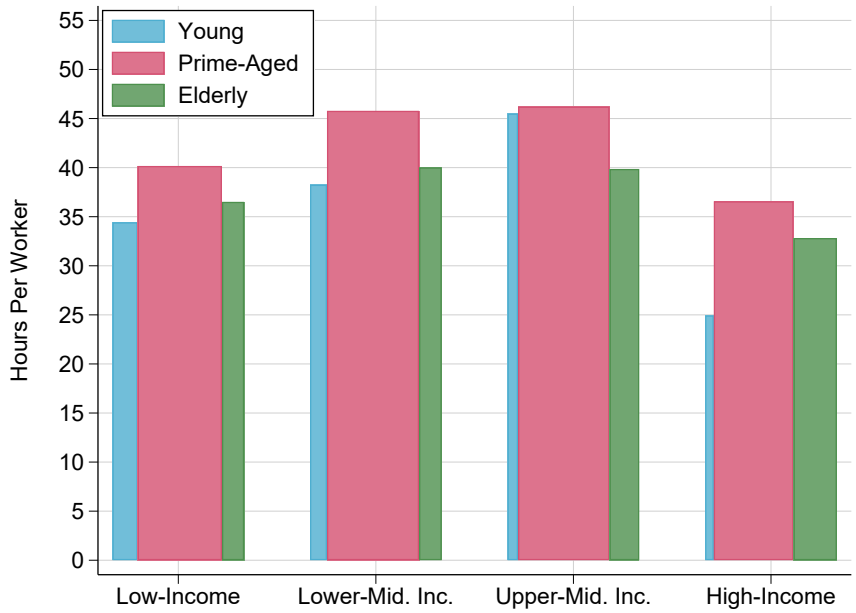
Notes: The figure depicts hours worked by gender and stages of development using the World Bank grouping of countries as of 2023 along the extensive and intensive margins (see main text Figure 3(a) for unconditional hours per adult). Estimates are weighted by adult population size in each country to be representative. The sample covers 97% of the world adult population. Panel (a) depicts employment rates of all adults (black bars), men (blue bars), and women (pink bars). Panel (b) depicts hours per worker (black bars), men (blue bars), and women (pink bars). Employment rates are approximately stable across income groups for all adults with a slight bell-shape for men and a slight U-shape for women. Hours of work per worker are bell shaped with development for all, men, and women.

Figure A.6: Hours Worked by Age and Development: Extensive vs. Intensive Margins

(a) Employment Rate

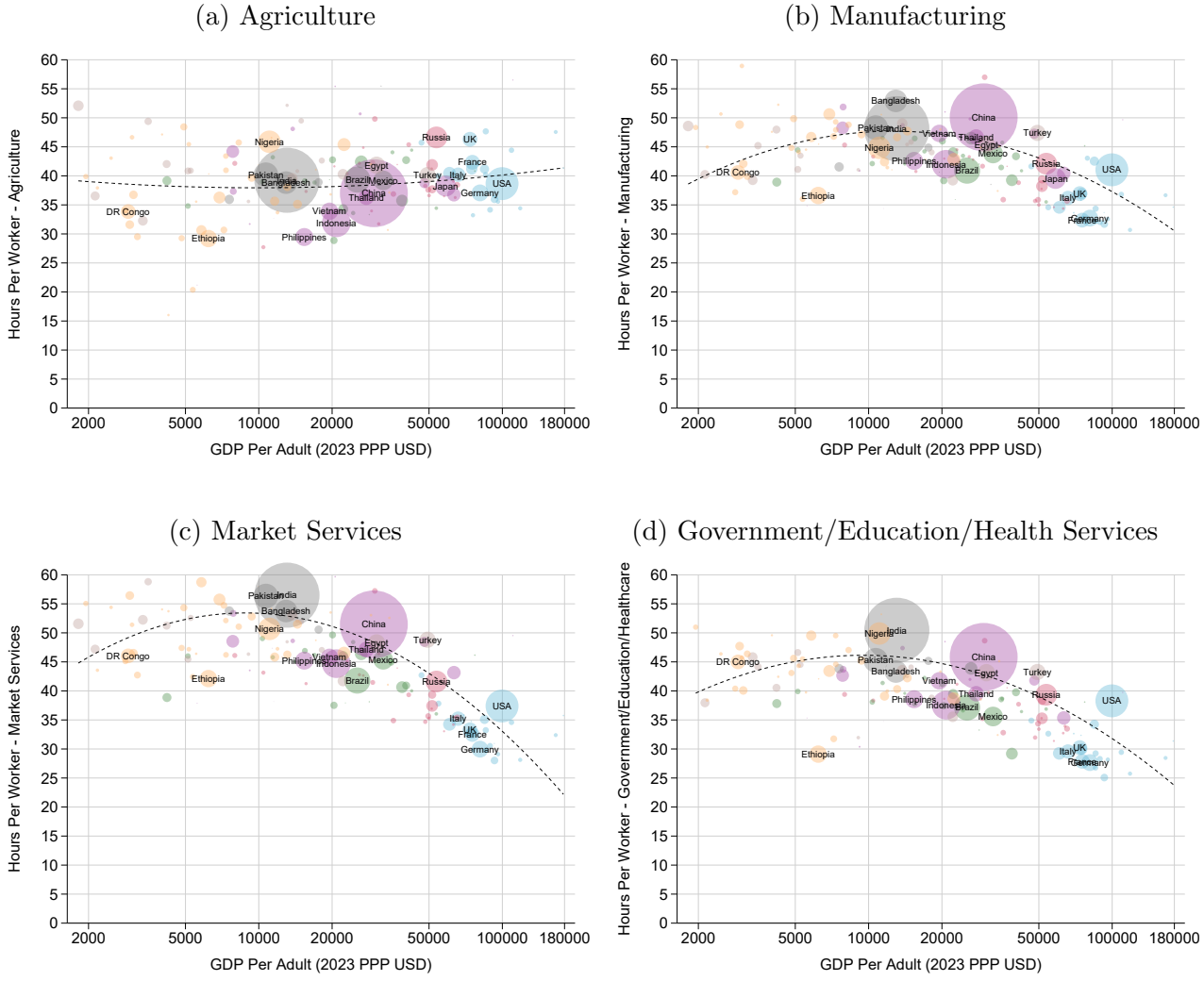


(b) Hours per Worker



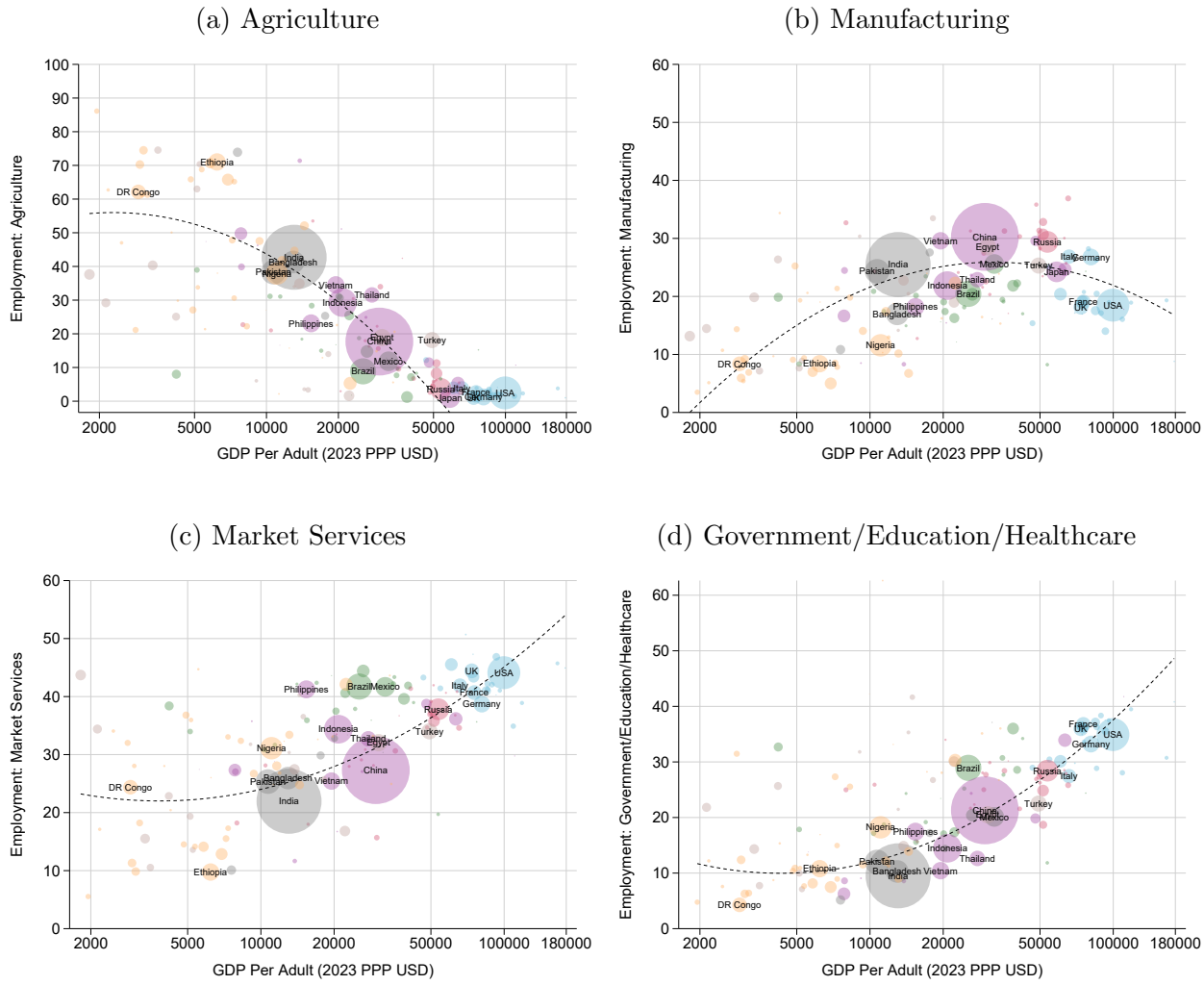
Notes: The figure depicts hours worked by age and stages of development using the World Bank grouping of countries as of 2023 along the extensive and intensive margins (see main text Figure 3(b) for unconditional hours per adult). Estimates are weighted by adult population size in each country to be representative. The sample covers 97% of the world adult population. Panel (a) depicts employment rates by age group: young (aged 15-19), prime-age (aged 20-59), and elderly (aged 60+). Panel (b) depicts hours per worker by age group. The width of each bar is proportional to its population size to illustrate the large variations in the age structure by development status. Employment rates increase for the prime-age and decrease for the young and elderly with development. Hours of work per worker are bell shaped with development for all age groups.

Figure A.7: Hours of Work per Worker by Country and Industry



Notes: The figure depicts average weekly hours of work per worker by industry and by country ranked by GDP per adult in 2023 PPP USD. For each country, we use the most recent labor force survey available (generally 2022 or 2019 as we exclude COVID years whenever possible, see appendix Table A.5). Each country's circle's area is proportional to its adult population; the largest countries' names are depicted. Colors correspond to world regions as depicted in Figure A.2. The best quadratic fit of the weighted circles is represented by the dashed curve. Panel (a) shows that hours per worker in agriculture are stable with GDP per adult at around 40. Panels (b)-(d) show that hours per worker in manufacturing, market services, and government/education/health services first increase slightly and then decrease sharply with GDP per adult. Hours per worker are highest for middle-income countries and in market services and manufacturing.

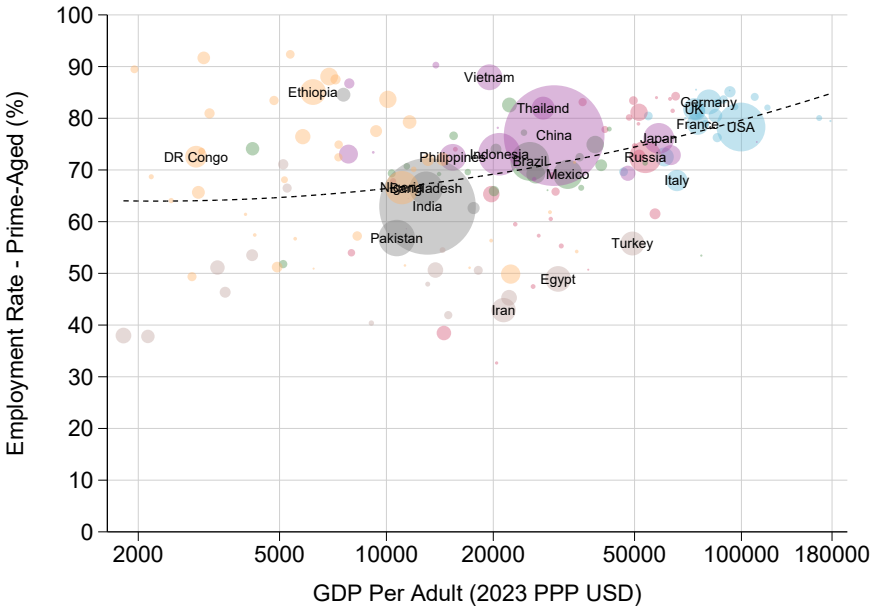
Figure A.8: Employment by Sector Over the Course of Development



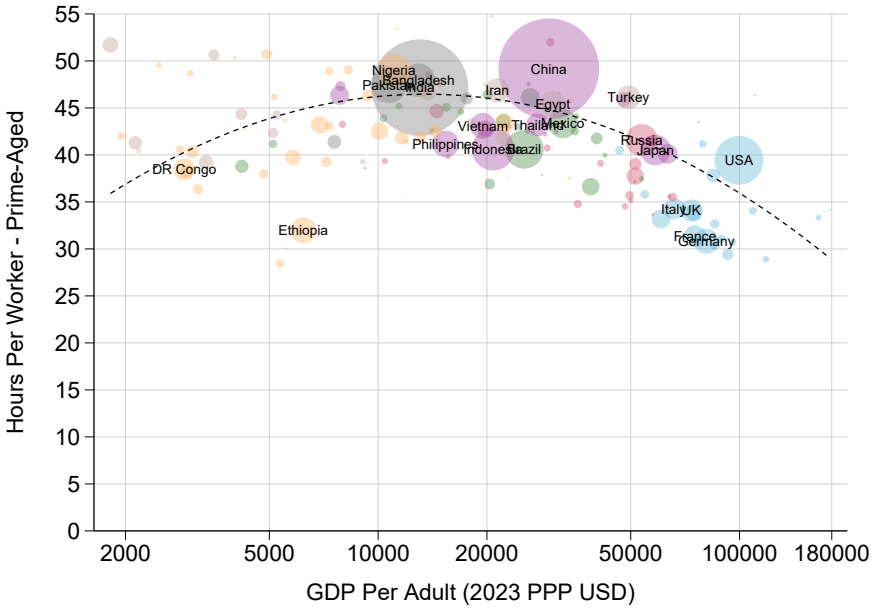
Notes: The figure depicts employment rates (among all adult workers) by industry and by country ranked by GDP per adult in 2023 PPP USD. For each country, we use the most recent labor force survey available (generally 2022 or 2019 as we exclude COVID years whenever possible, see appendix Table A.5). Each country's circle's area is proportional to its adult population; the largest countries' names are depicted. Colors correspond to world regions as depicted in Figure A.2. The best quadratic fit of the weighted circles is represented by the dashed curve. Panel (a) shows that the share of workers in agriculture falls sharply with development. Panel (b) shows that the share of workers in manufacturing first increases and then decreases with development. Panel (c) shows that the shares of workers in market services and government services increase with development.

Figure A.9: Hours Worked among Prime-Age Adults: Extensive vs. Intensive Margins

(a) Employment Rate



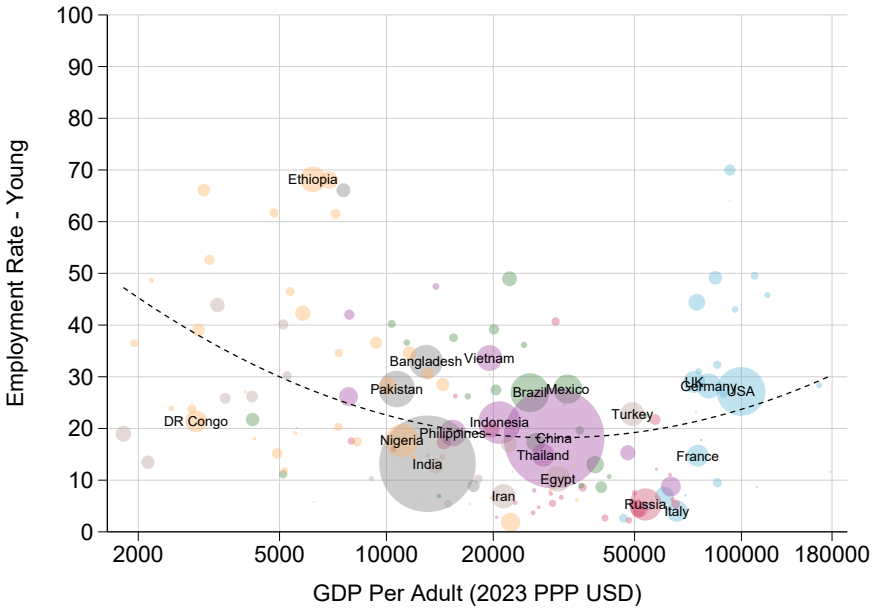
(b) Hours per Worker



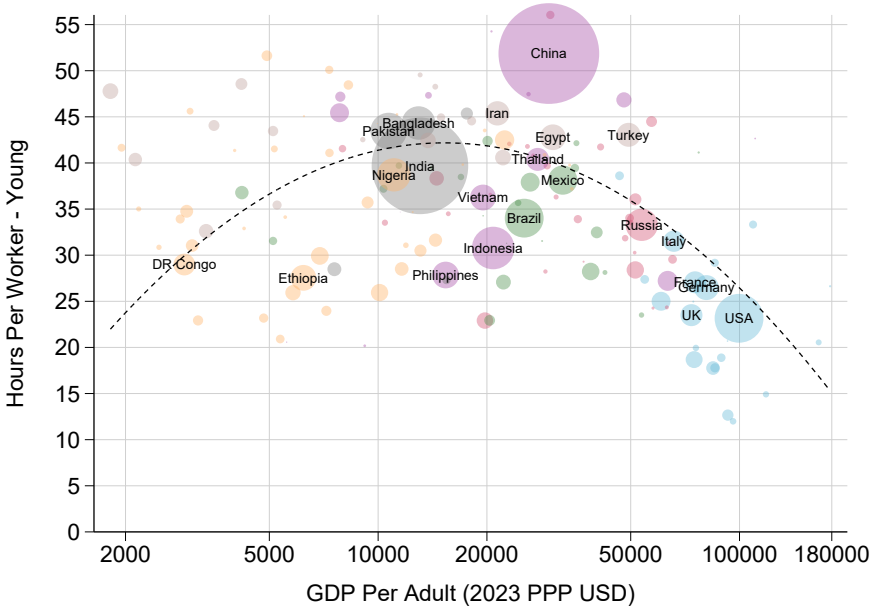
Notes: The figure depicts average hours worked among prime-age adults (age 20-59) by country ranked by GDP per adult in 2023 PPP USD along the extensive and intensive margins (see main text Figure 6(a) for unconditional hours). Panel (a) plots employment rates. Panel (b) plots hours per worker. For each country, we use the most recent labor force survey available (generally 2022 or 2019 as we exclude COVID years whenever possible, see appendix Table A.5). Each country's circle's area is proportional to its adult population; the largest countries' names are depicted. Colors correspond to world regions as depicted in Figure A.2. The best quadratic fit of the weighted circles is represented by the dashed curve. The employment rate of prime-age adults increases with development while hours per worker are bell shaped with development.

Figure A.10: Hours Worked among Young Adults: Extensive vs. Intensive Margins

(a) Employment Rate



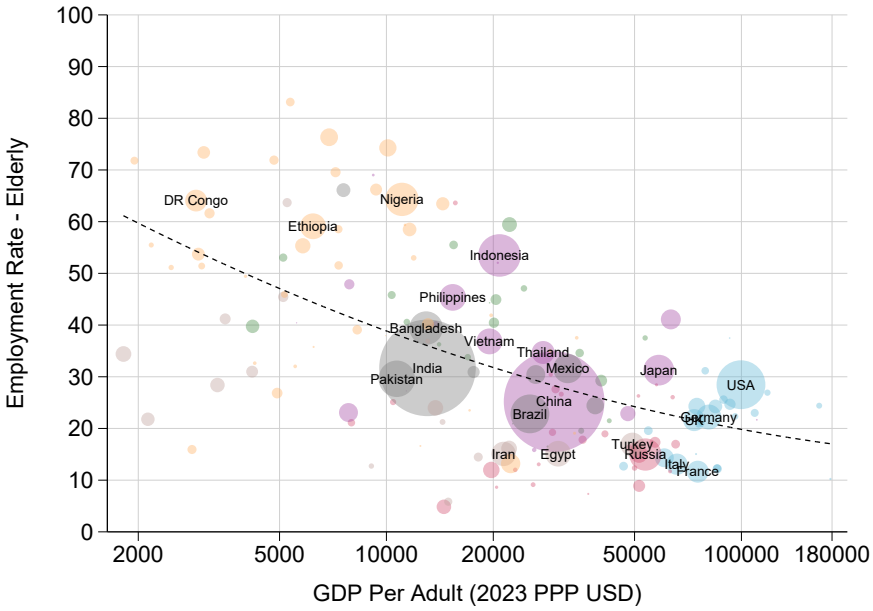
(b) Hours per Worker



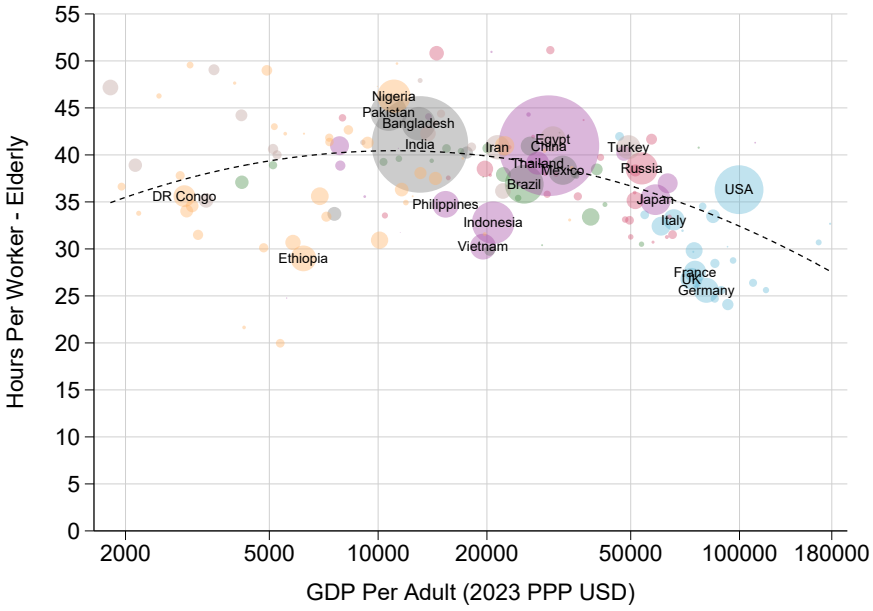
Notes: The figure depicts average hours worked among the young (age 15-19) by country ranked by GDP per adult in 2023 PPP USD along the extensive and intensive margins (see main text Figure 6(b) for unconditional hours). Panel (a) plots employment rates. Panel (b) plots hours per worker. For each country, we use the most recent labor force survey available (generally 2022 or 2019 as we exclude COVID years whenever possible, see appendix Table A.5). Each country's circle's area is proportional to its adult population; the largest countries' names are depicted. Colors correspond to world regions as depicted in Figure A.2. The best quadratic fit of the weighted circles is represented by the dashed curve. The employment rate of young workers is U-shaped with development while hours per worker are bell shaped with development.

Figure A.11: Hours Worked among the Elderly: Extensive vs. Intensive Margins

(a) Employment Rate



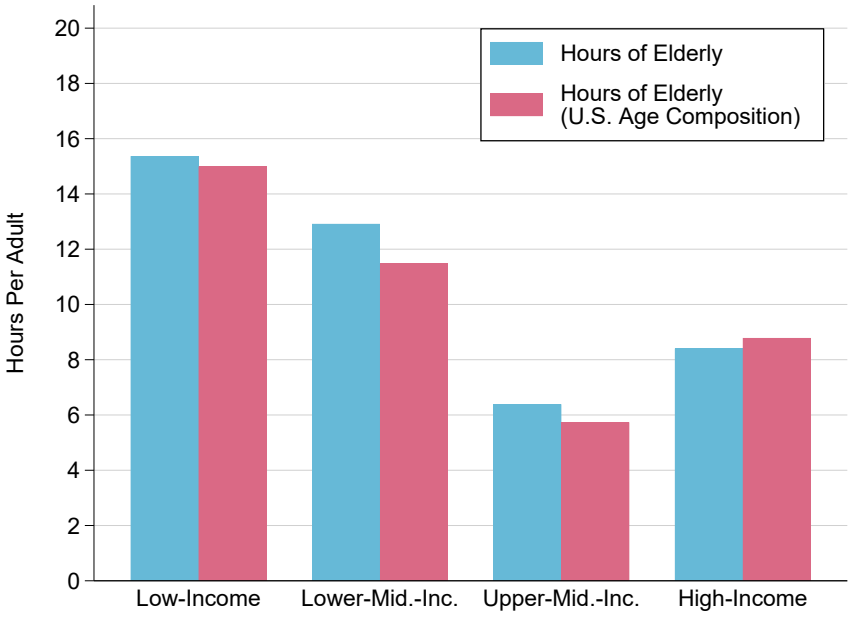
(b) Hours per Worker



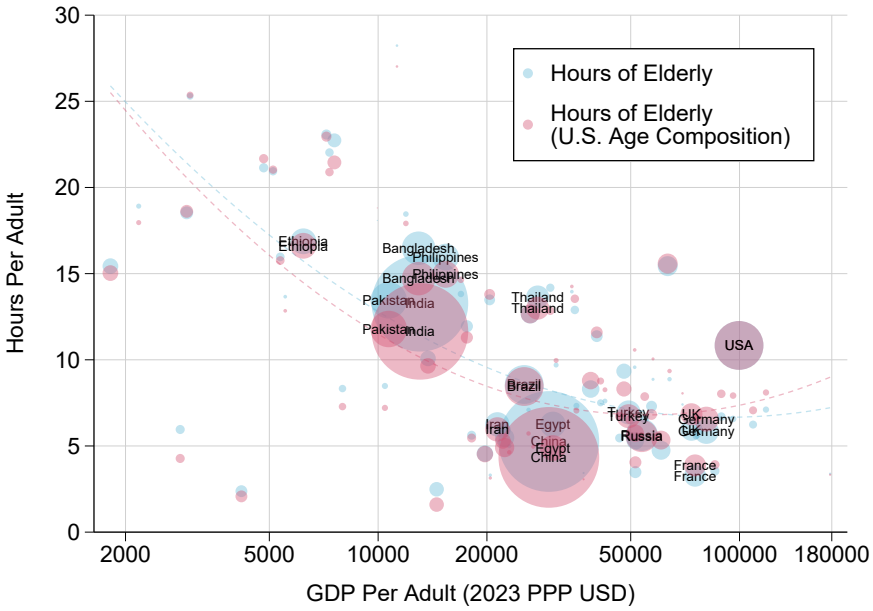
Notes: The figure depicts average hours worked among the elderly (age 60+) by country ranked by GDP per adult in 2023 PPP USD along the extensive and intensive margins (see main text Figure 6(c) for unconditional hours). Panel (a) plots employment rates. Panel (b) plots hours per worker. For each country, we use the most recent labor force survey available (generally 2022 or 2019 as we exclude COVID years whenever possible, see appendix Table A.5). Each country's circle's area is proportional to its adult population; the largest countries' names are depicted. Colors correspond to world regions as depicted in Figure A.2. The best quadratic fit of the weighted circles is represented by the dashed curve. The employment rate of elderly workers decreases with development while hours per worker are bell shaped with development.

Figure A.12: Hours Worked by the Elderly: Controlling for the Age Structure

(a) Hours of the Elderly and the Age Structure: 4 Groups



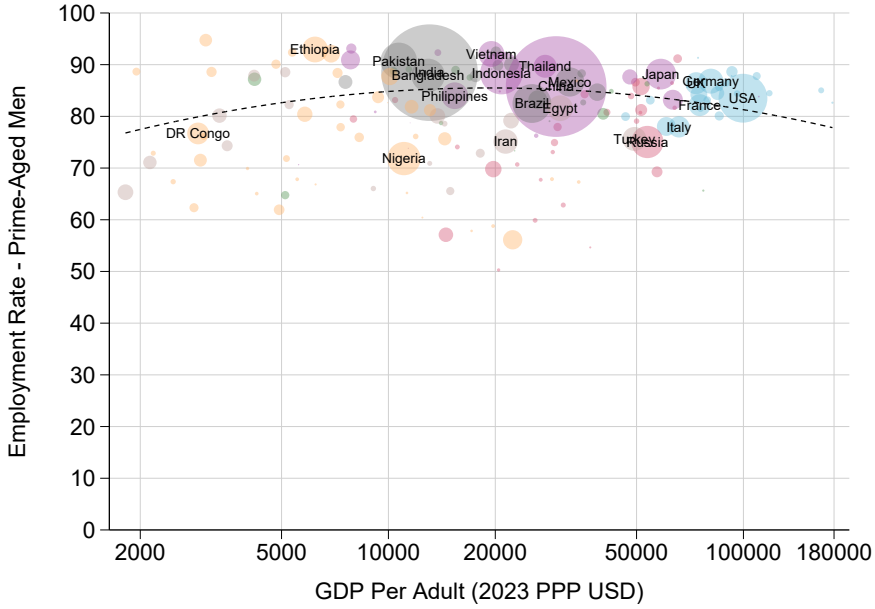
(b) Hours of the Elderly and the Age Structure: All Countries



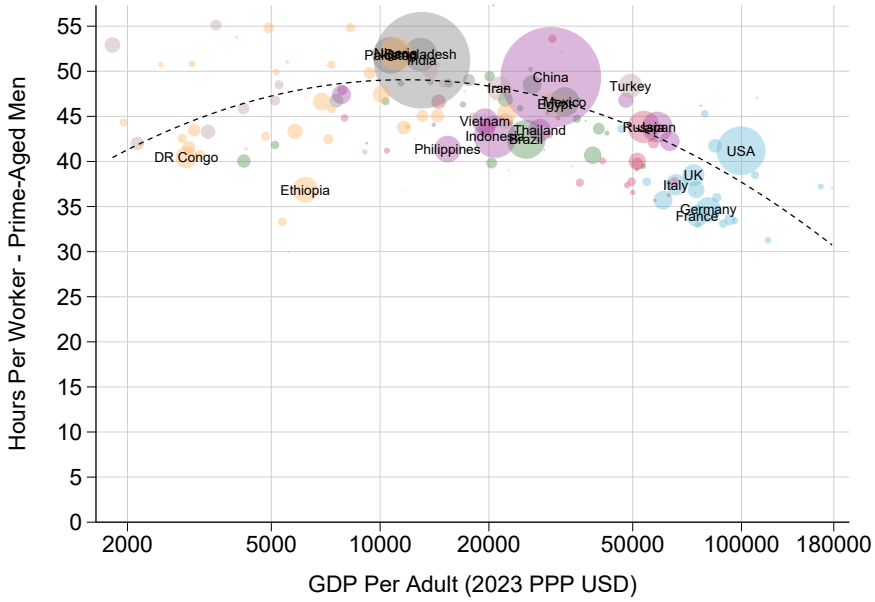
Notes: The figure compares actual hours of work of the elderly (aged 60+) to hours of work of the elderly after reweighting each age group to match the US age composition. Panel (a) considers the World Bank four groups and panel (b) depicts each country individually. Overall, adjusting for the age composition of the elderly has only a fairly modest impact on elderly hours of work and does not change the overall pattern.

Figure A.13: Hours of Work of Prime-Age Men: Extensive vs. Intensive Margins

(a) Employment Rate



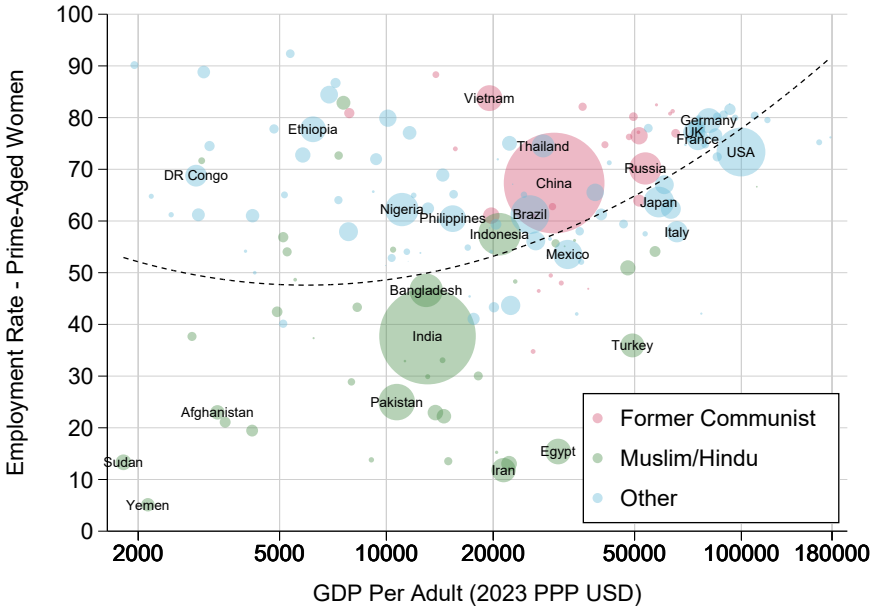
(b) Hours per Worker



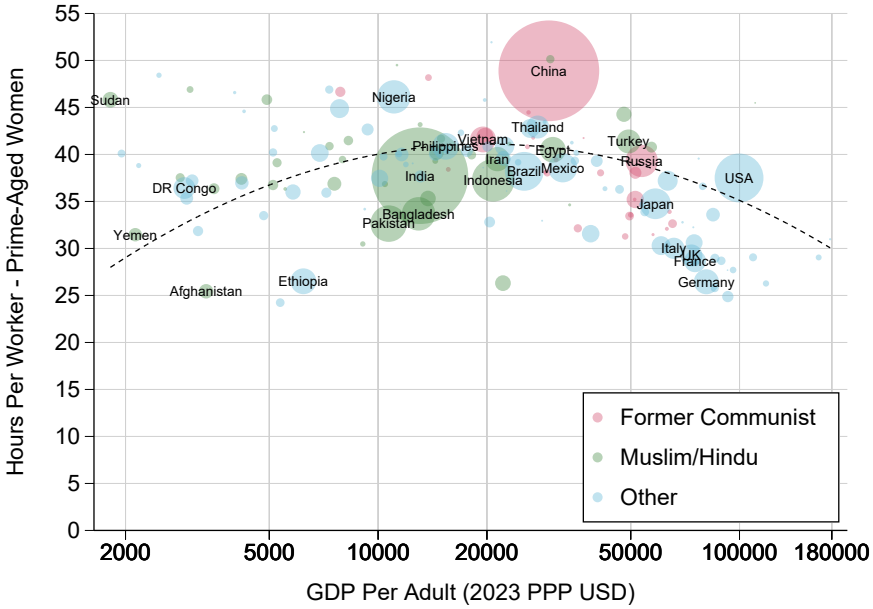
Notes: The figure depicts average hours worked among prime-age men (age 20-59) by country ranked by GDP per adult in 2023 PPP USD along the extensive and intensive margins (see main text Figure 8(b) for unconditional hours). Panel (a) plots employment rates. Panel (b) plots hours per worker. For each country, we use the most recent labor force survey available (generally 2022 or 2019 as we exclude COVID years whenever possible, see appendix Table A.5). Each country's circle's area is proportional to its adult population; the largest countries' names are depicted. Colors correspond to world regions as depicted in Figure A.2. The best quadratic fit of the weighted circles is represented by the dashed curve. The employment rate of prime-age men is stable with development while hours per worker are bell shaped with development.

Figure A.14: Hours of Work of Prime-Age Women: Extensive vs. Intensive Margins

(a) Employment Rate



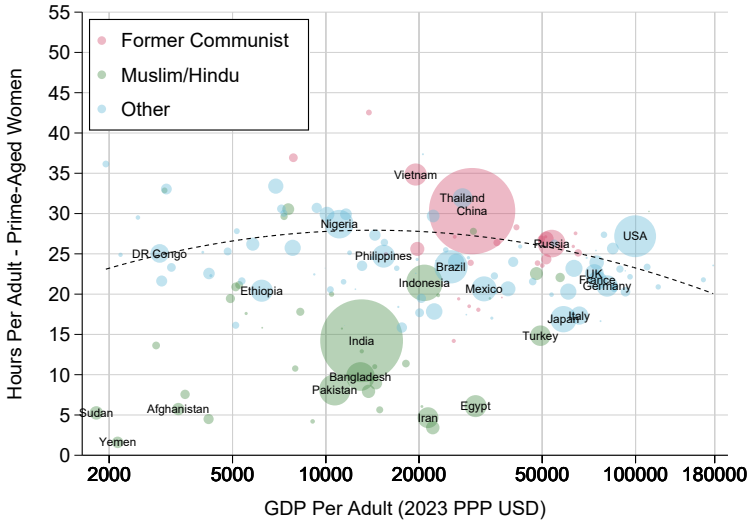
(b) Hours per Worker



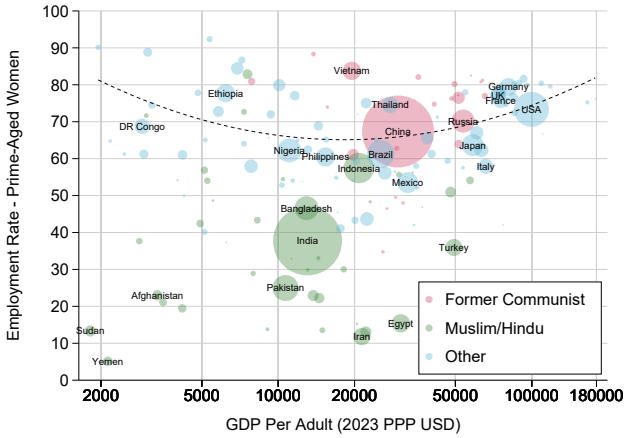
Notes: The figure depicts average hours worked among prime-age women (age 20-59) by country ranked by GDP per adult in 2023 PPP USD along the extensive and intensive margins (see main text Figure 8(b) for unconditional hours). Panel (a) plots employment rates. Panel (b) plots hours per worker. For each country, we use the most recent labor force survey available (generally 2022 or 2019 as we exclude COVID years whenever possible, see appendix Table A.5). Each country's circle's area is proportional to its adult population; the largest countries' names are depicted. The best quadratic fit of the weighted circles is represented by the dashed curve. The employment rate of prime-age women increases with development while hours per worker are bell shaped with development.

Figure A.15: Hours of Work of Prime-Age Women: Quadratic Fit Excluding Muslim/Hindu Countries

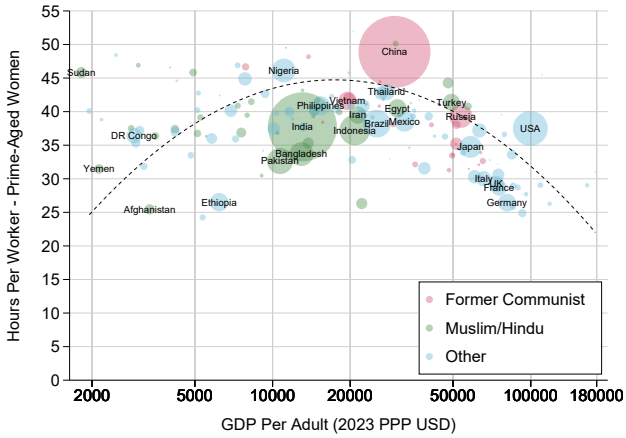
(a) Hours per Adult



(b) Employment Rate



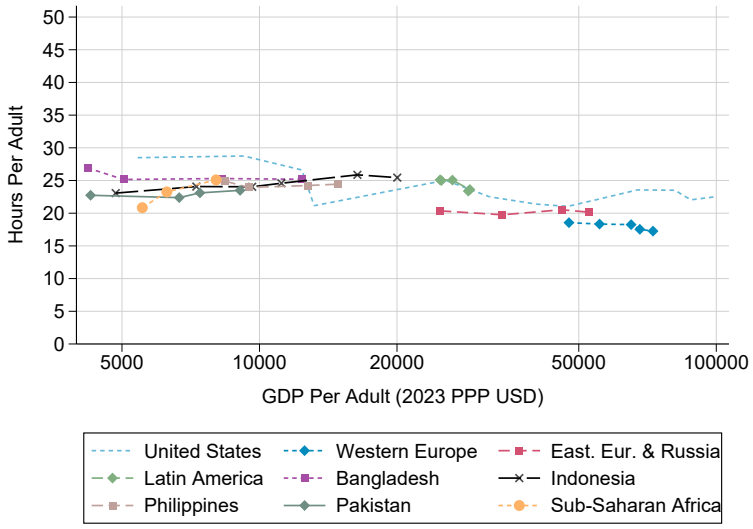
(c) Hours per Worker



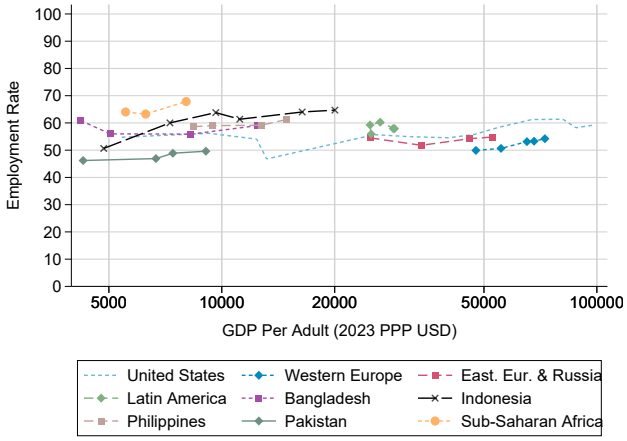
Notes: The figure depicts average hours worked among prime-age women (age 20-59) by country ranked by GDP per adult in 2023 PPP USD. Panel(a) plots unconditional hours. Panel (b) plots employment rates and Panel (c) plots hours per worker. For each country, we use the most recent labor force survey available (generally 2022 or 2019 as we exclude COVID years whenever possible, see appendix Table A.5). Each country's circle's area is proportional to its adult population; the largest countries' names are depicted. Colors group countries in three groups most relevant for female hours worked: former communist countries in red, Muslim/Hindu countries in green, and other countries in blue. The best quadratic fit of the weighted circles is represented by the dashed curve. The quadratic fit excludes Muslim/Hindu countries (depicted in green circles) in this specification (see Figure 8(b), and appendix Figure A.14(a)-(b) for the best quadratic fit including all countries). Excluding Muslim/Hindu countries, hours of work of prime-age women is slightly bell-shaped with development; the employment rate of prime-age women is slighly U-shaped with development while hours per worker are strongly bell shaped with development.

Figure A.16: Evolution of Hours Worked, All Adults: Extensive vs. Intensive Margins

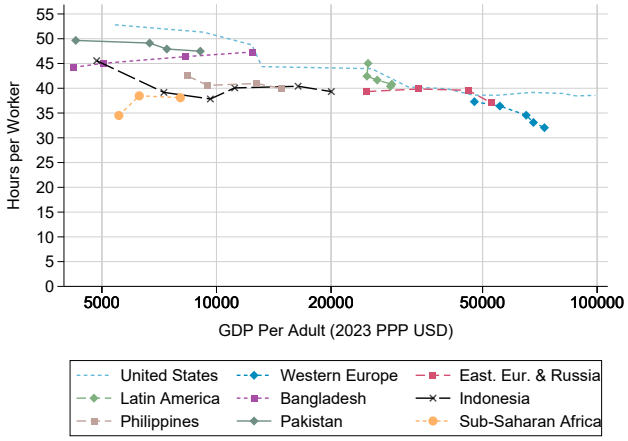
(a) Hours per Adult



(b) Employment Rate



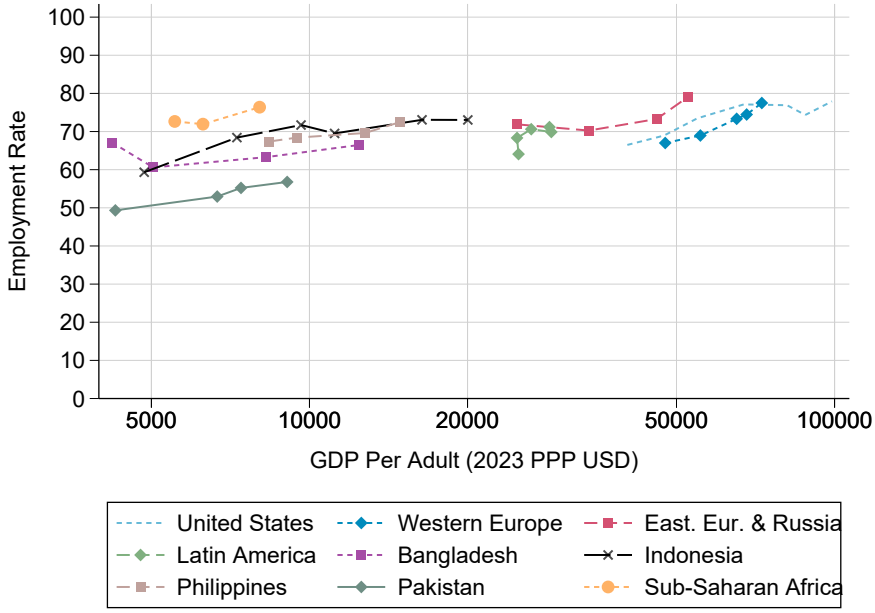
(c) Hours per Worker



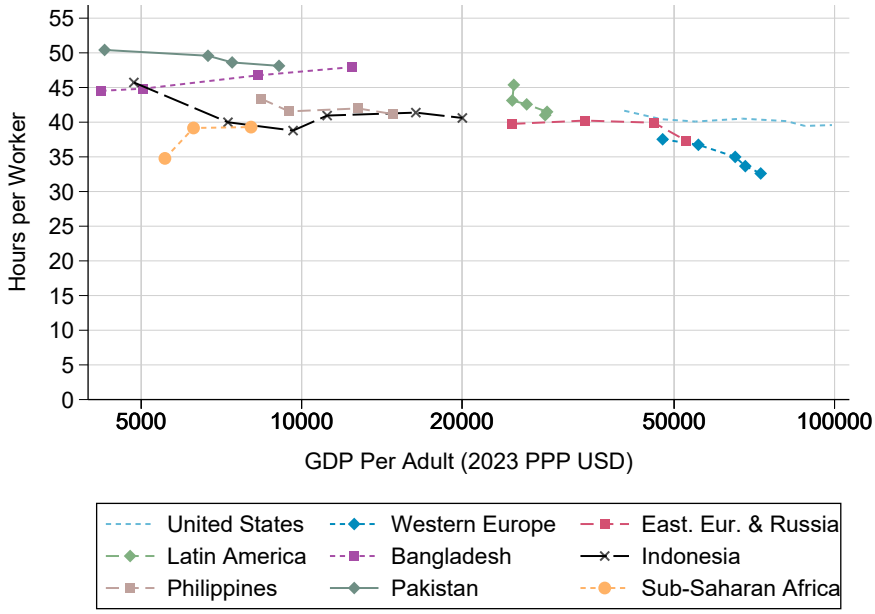
Notes: The figure depicts the evolution by decade of (a) hours per adult, (b) employment rates, and (c) hours per worker among all adults for some regions and countries for which we have long time series (covering 3 decades or more). The estimates are plotted against country or region GDP per adult in the corresponding period (expressed in 2023 PPP USD). In the series the last dot is the 2020s (excluding COVID years 2020-21), the next to last dot is the 2010s, etc. Within regions/countries, hours of work per adult are generally stable over time. Employment rates for all adults tend to increase overtime while hours per worker tend to decrease over time.

Figure A.17: Evolution of Hours Worked, Prime-Age Adults: Extensive vs. Intensive Margins

(a) Employment Rate



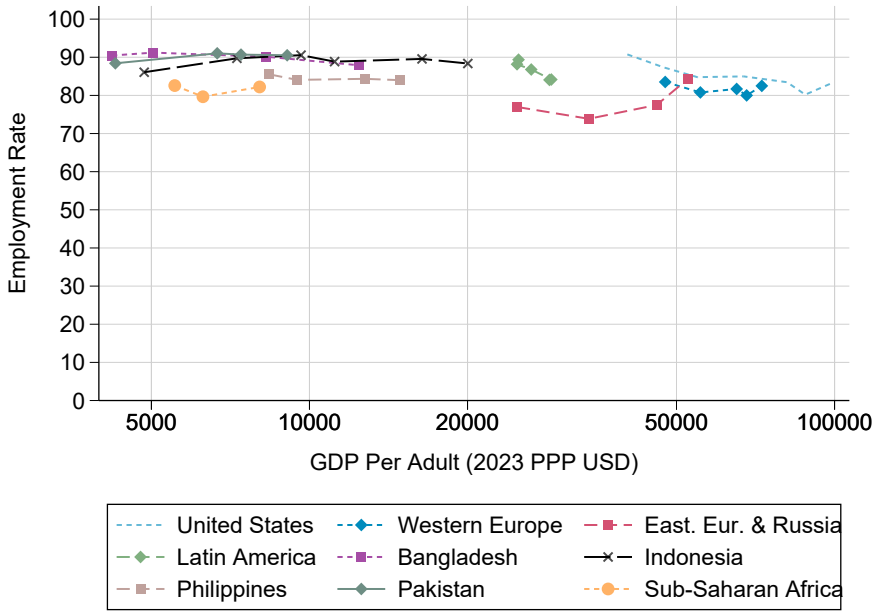
(b) Hours per Worker



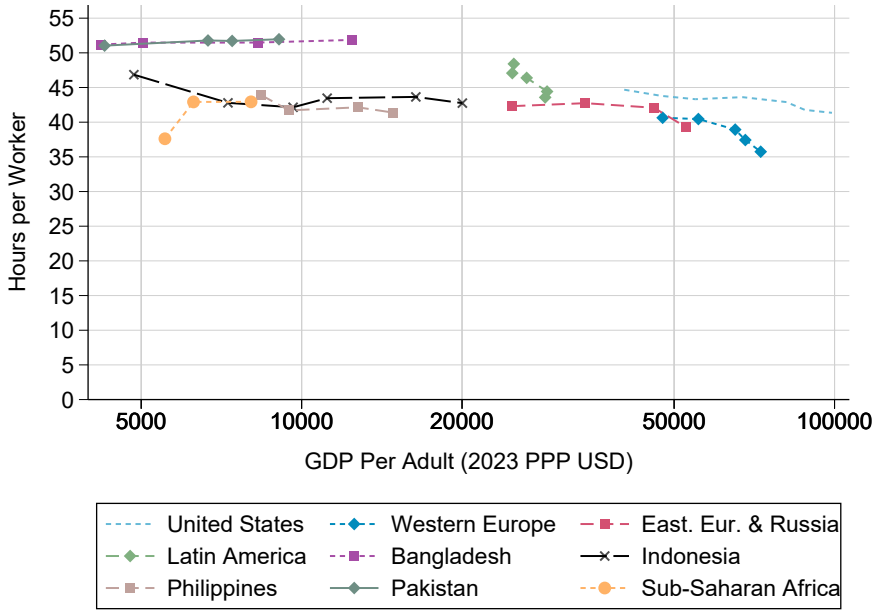
Notes: The figure depicts the evolution by decade of (a) employment rates and (b) hours per worker among prime-age adults (see main text Figure 9(a) for unconditional hours). Estimates are plotted against country or region GDP per adult in the corresponding period (expressed in 2023 PPP USD). In the series the last dot is the 2020s (excluding COVID years 2020-21), the next to last dot is the 2010s, etc. Employment rates for prime-age adults are about stable overtime. Hours per worker tend to be stable for lower income countries/regions and decreasing in richer countries/regions.

Figure A.18: Evolution of Hours Worked, Prime-Age Men: Extensive vs. Intensive Margins

(a) Employment Rate



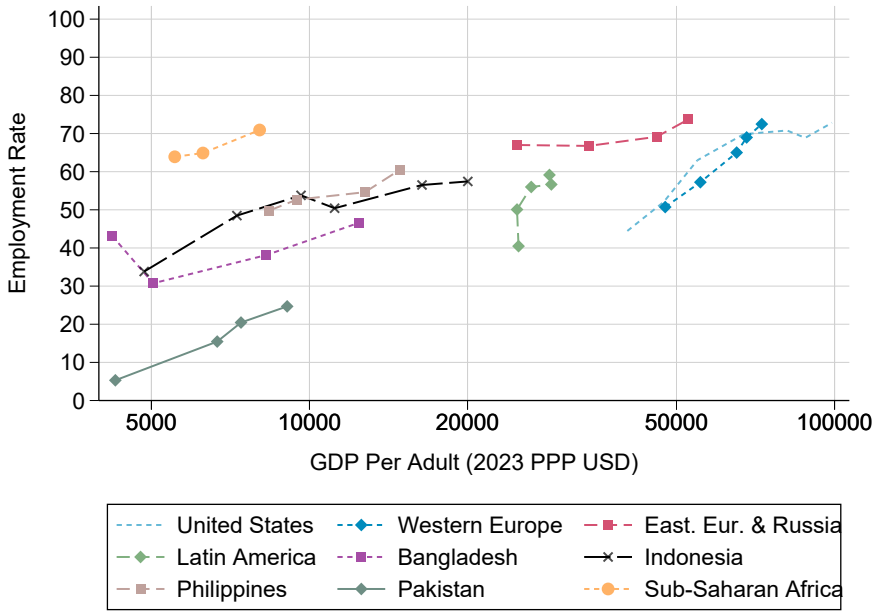
(b) Hours per Worker



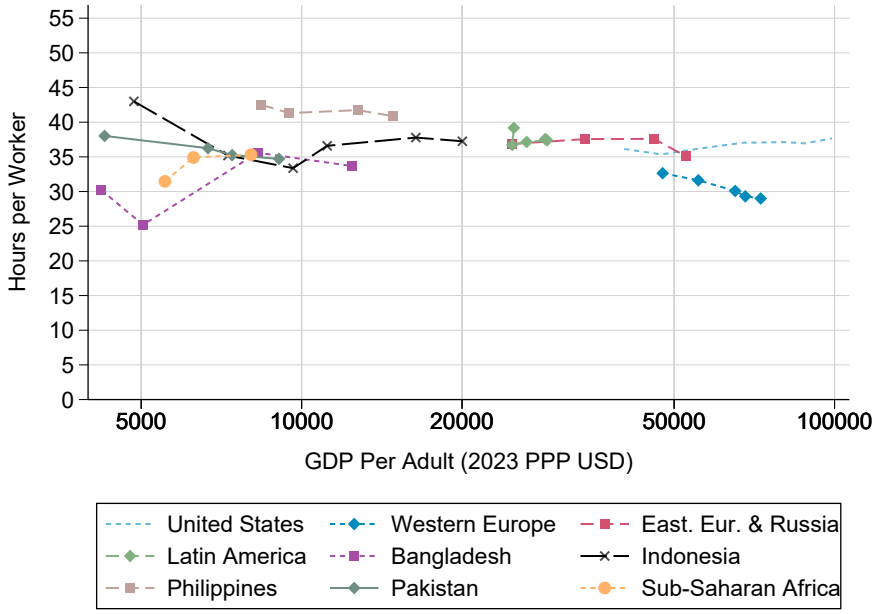
Notes: The figure depicts the evolution by decade of (a) employment rates and (b) hours per worker among prime-age men (see main text Figure 9(b) for unconditional hours). Estimates are plotted against country or region GDP per adult in the corresponding period (expressed in 2023 PPP USD). In the series the last dot is the 2020s (excluding COVID years 2020-21), the next to last dot is the 2010s, etc. Employment rates for prime-age men are about stable overtime. Hours per worker for prime-age men tend to be stable in lower income countries/regions and decreasing in richer countries/regions.

Figure A.19: Evolution of Hours Worked, Prime-Age Women: Extensive vs. Intensive Margins

(a) Employment Rate



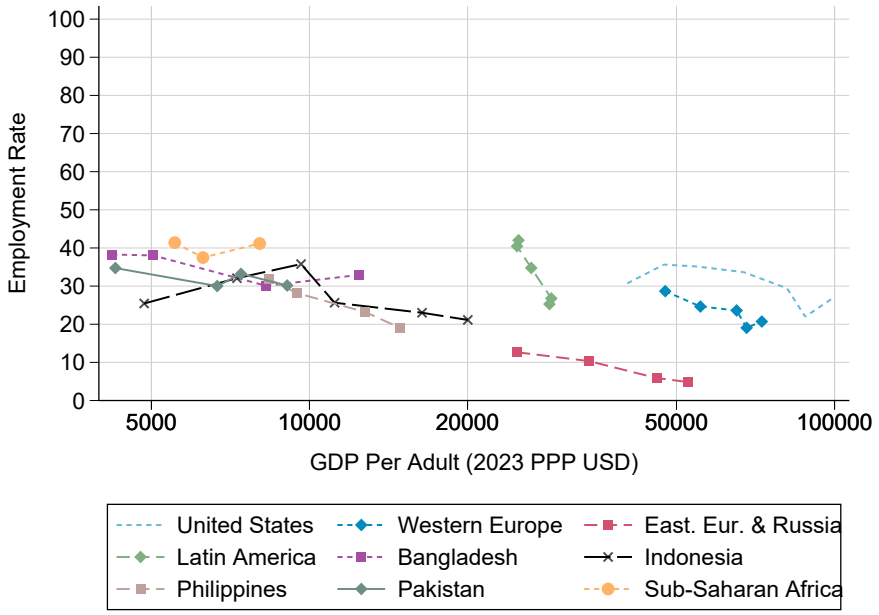
(b) Hours per Worker



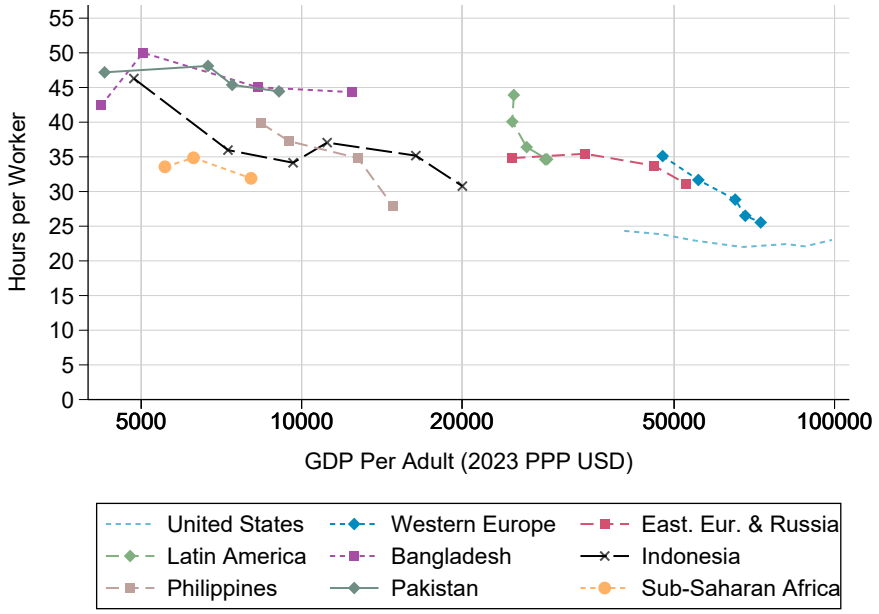
Notes: The figure depicts the evolution by decade of (a) employment rates and (b) hours per worker among prime-age women (see main text Figure 9(b) for unconditional hours). Estimates are plotted against country or region GDP per adult in the corresponding period (expressed in 2023 PPP USD). In the series the last dot is the 2020s (excluding COVID years 2020-21), the next to last dot is the 2010s, etc. Employment rates for prime-age women are increasing overtime everywhere, and often sharply so. Hours per worker for prime-age women tend to be stable in lower income countries/regions and slightly decreasing in richer countries/regions.

Figure A.20: Evolution of Hours Worked, Young Adults: Extensive vs. Intensive Margins

(a) Employment Rate



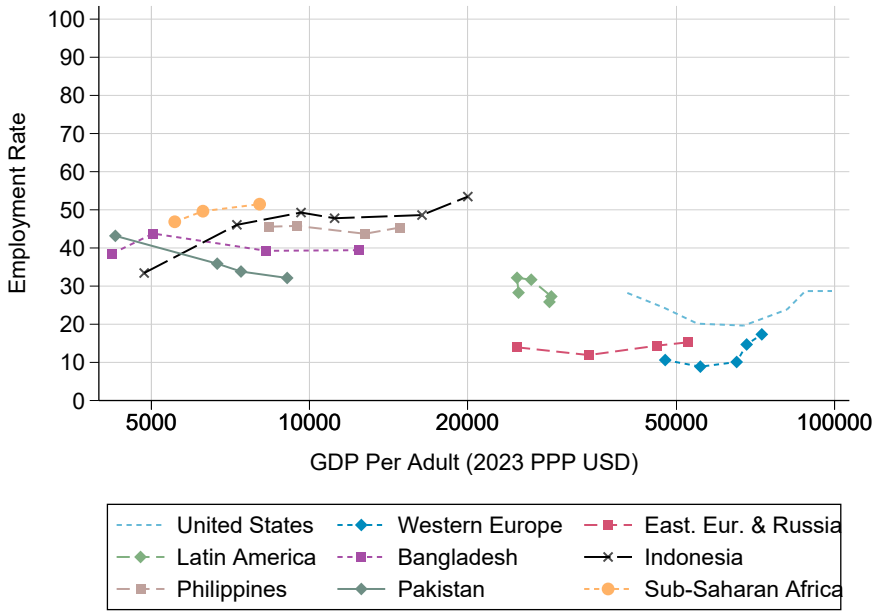
(b) Hours per Worker



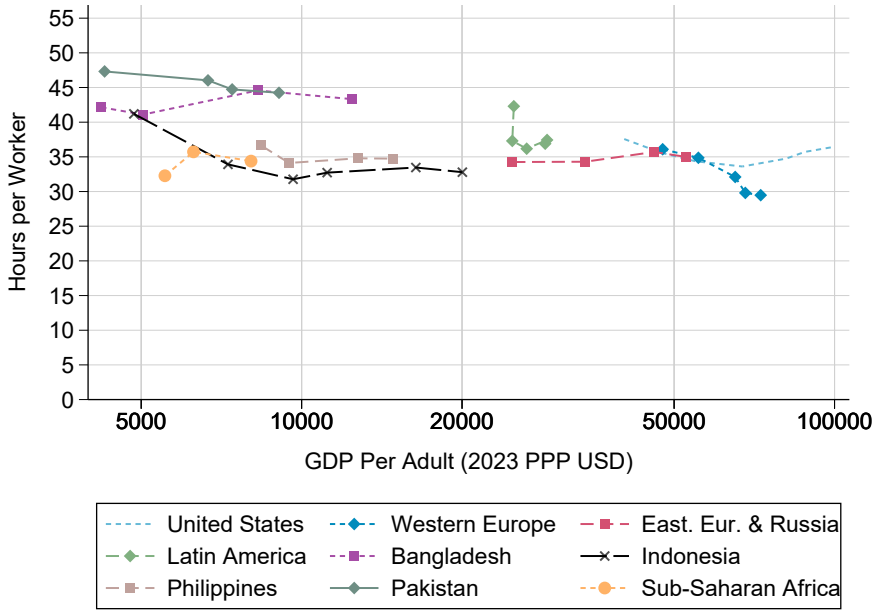
Notes: The figure depicts the evolution by decade of (a) employment rates and (b) hours per worker among young adults aged 15-19 (see main text Figure 10(a) for unconditional hours). Estimates are plotted against country or region GDP per adult in the corresponding period (expressed in 2023 PPP USD). In the series the last dot is the 2020s (excluding COVID years 2020-21), the next to last dot is the 2010s, etc. Employment rates for young adults are decreasing overtime everywhere, and often sharply so. Hours per worker for young adults are generally stable within countries/regions, and sometimes decreasing.

Figure A.21: Evolution of Hours Worked, Elderly: Extensive vs. Intensive Margins

(a) Employment Rate



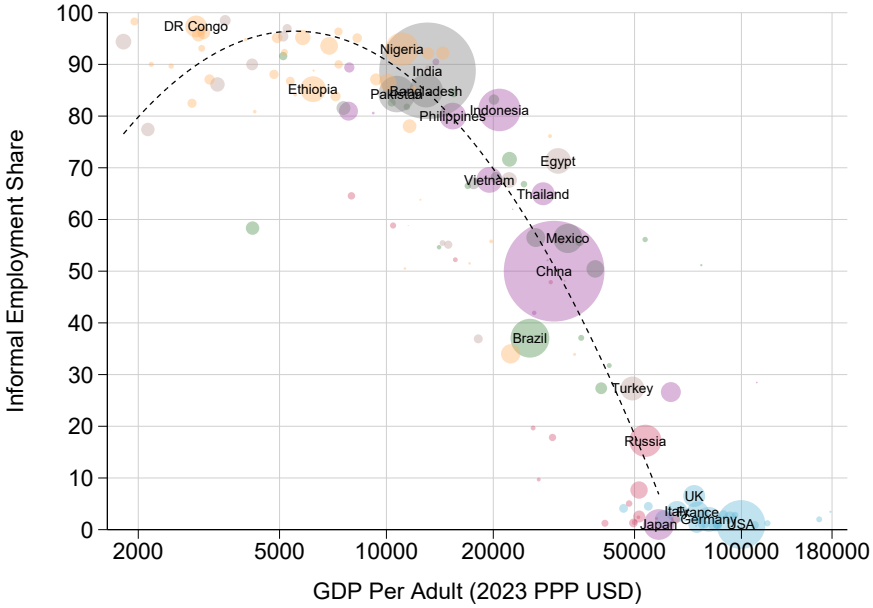
(b) Hours per Worker



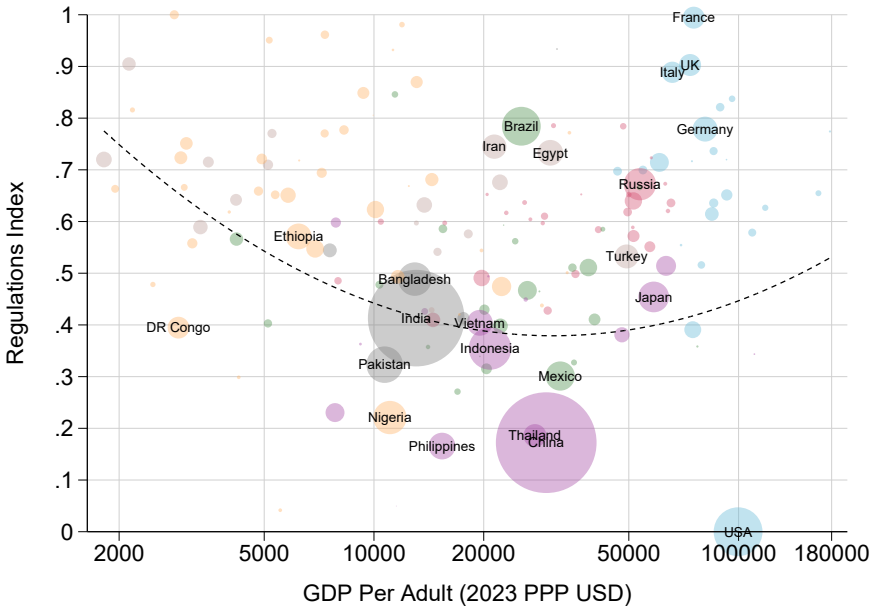
Notes: The figure depicts the evolution by decade of (a) employment rates and (b) hours per worker among the elderly aged 60+ (see main text Figure 10(b) for unconditional hours). Estimates are plotted against country or region GDP per adult in the corresponding period (expressed in 2023 PPP USD). In the series the last dot is the 2020s (excluding COVID years 2020-21), the next to last dot is the 2010s, etc. Employment rates for older adults are generally stable or slightly increasing overtime within countries/regions. Hours per worker for older adults are generally stable within countries/regions, and sometimes decreasing.

Figure A.22: Informality and Regulations vs. GDP per adult

(a) Fraction workers informal



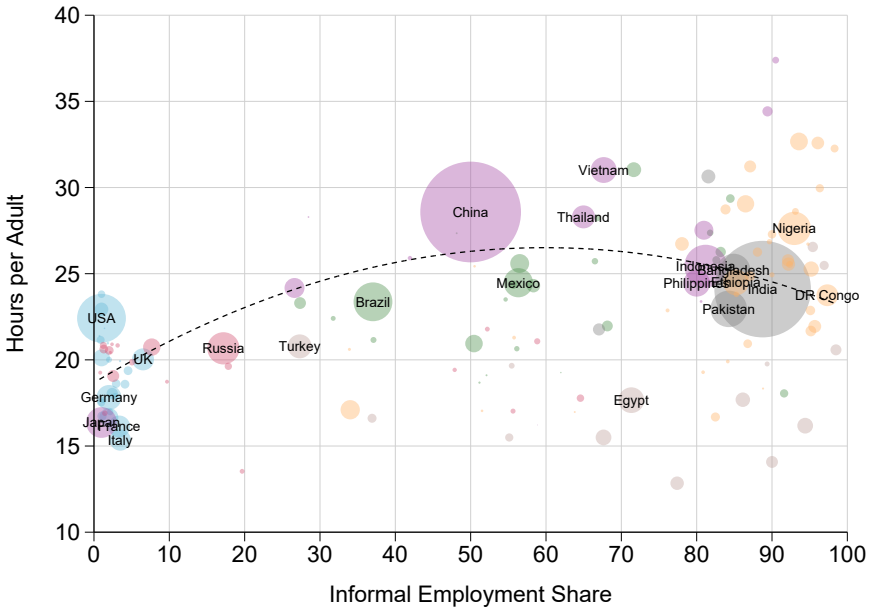
(b) Regulation index



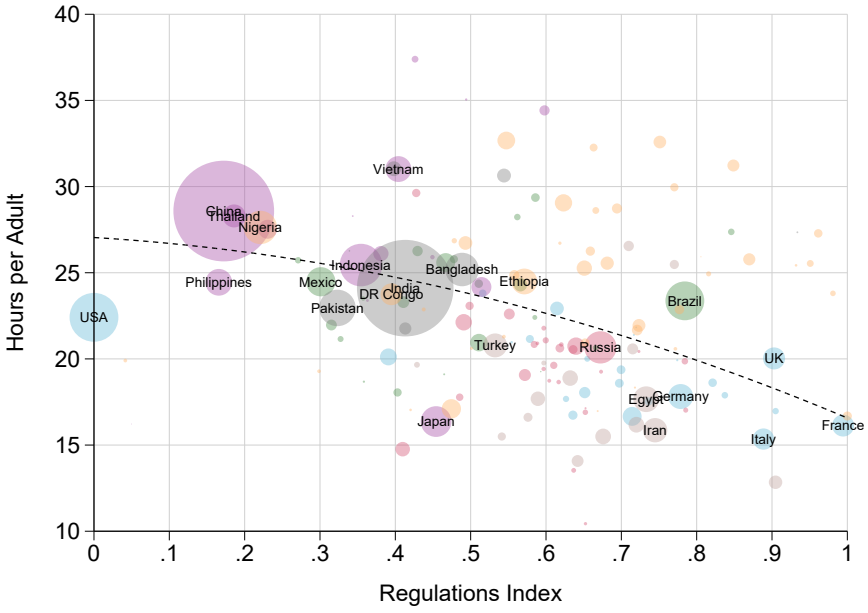
Notes: Panel (a) depicts the fraction of informal workers (among all workers) by country ranked by GDP per adult in 2023 PPP USD. Panel (b) depicts the working hours regulation index by country created using the working hours regulations variables compiled in the World Bank Employing Workers database. Panel (a) shows that informality is extremely high in poor countries and falls sharply with economic development. Panel (b) shows that working hours regulations, which generally apply only to formal workers, are U-shaped with development but with very large heterogeneity across countries.

Figure A.23: Informality and Regulations vs. Hours per Adult

(a) Fraction Workers Informal



(b) Regulation Index



Notes: Panel (a) depicts the fraction of informal workers (among all workers) against average hours of work per adult by country. Panel (b) depicts the working hours regulation index vs. hours of work by country. The working hours regulation index by country created using the working hours regulations variables compiled in the World Bank Employing Workers database. Panel (a) shows that hours of work are higher when informality is high. Panel (b) shows that hours per adult are lower when employment regulations are strong.

Table A.1: A New Database on Global Hours Worked

	Number of Countries	Earliest Year	Number of Surveys	Sample Size	Population Covered (Last Year)
Western Europe and Anglosphere	24	1963	827	119,136,124	99.4%
Eastern Europe and ex-USSR	28	1991	413	30,172,722	100%
Latin America	24	1971	484	88,593,203	97.2%
East and Southeast Asia	18	1976	205	66,962,951	96.5%
South Asia	6	1973	58	11,871,575	100%
Middle East and North Africa	17	1997	131	25,621,215	83.7%
Sub-Saharan Africa	40	1987	129	11,212,459	98.5%
World	157	1963	2,247	353,570,249	97.0%

Notes. This table describes various features of the new database we have constructed by regions in rows (regions are defined on Figure A.2) and globally in the last row. Sample size sums over all individual micro-records. The last column reports the fraction of the population covered (when pooling across countries).

Table A.2: Survey Data Sources

Source	Sample Size	Number of Countries	Number of Surveys	Time Period
I2D2	18,534,314	67	258	1977-2017
GMD	6,249,581	19	56	2003-2023
GLD	132,590,241	26	309	1981-2023
ILO	54,976,164	78	500	1991-2022
EU-LFS	116,938,209	31	948	1983-2022
Other	24,353,481	27	178	1960-2023

Notes. This table reports the number of individual respondents, the number of countries, the number of surveys, and the time period covered by data source in our final database. I2D2: World Bank I2D2 survey microdatabase. GMD: World Bank Global Monitoring Database. GLD: World Bank Global Labor Database. ILO: International Labor Organization labor force survey microdatabase. EU-LFS: European Union Labor Force Surveys. Other: Luxembourg Income Study survey microdata tabulations, IPUMS International census microdata, Life in Transition Survey, and other country-specific microdata sources.

Table A.3: Elasticities of Hours Worked: Taxes vs. Transfers

A. Cross-country regressions

	Hours Per Adult	Hours Per Worker	Employment Rate	Prime Aged	Prime-Aged Men	Prime-Aged Women	Elderly
$\log 1-\tau(L)$	0.916***	0.930***	0.158	0.732***	0.873***	0.354	-0.772
	(0.251)	(0.241)	(0.217)	(0.221)	(0.197)	(0.483)	(0.731)
$\log 1-\tau(K)$	0.053	0.080	-0.080	0.072	0.124	0.040	0.634
	(0.117)	(0.100)	(0.141)	(0.112)	(0.112)	(0.235)	(0.391)
$\log 1/(1+\tau(C))$	-0.584	0.209	-0.097	-0.281	-0.414	-0.199	-0.134
	(0.617)	(0.538)	(0.688)	(0.550)	(0.623)	(1.818)	(2.545)
Log GDP Per Adult	0.098***	0.074**	0.026	0.113***	0.076***	0.188**	-0.284***
	(0.029)	(0.031)	(0.032)	(0.026)	(0.027)	(0.074)	(0.103)
Muslim/Hindu Share	-0.292***	-0.034	-0.267***	-0.293***	0.024	-1.055***	0.208
	(0.052)	(0.064)	(0.050)	(0.049)	(0.056)	(0.134)	(0.209)
Social Protection/GDP	-0.006	0.014*	-0.011	-0.001	0.005	-0.019	-0.093***
	(0.009)	(0.007)	(0.009)	(0.008)	(0.008)	(0.017)	(0.026)
Health/GDP	-0.030**	-0.028*	-0.009	-0.028**	-0.013	-0.053***	0.151***
	(0.013)	(0.016)	(0.007)	(0.012)	(0.013)	(0.019)	(0.056)
Other Expenditure/GDP	0.005*	0.006*	-0.001	0.008***	0.006*	0.017**	-0.015
	(0.003)	(0.003)	(0.003)	(0.002)	(0.004)	(0.008)	(0.010)
N	126	126	126	126	126	126	126
Adjusted R2	0.64	0.47	0.39	0.58	0.57	0.68	0.63

B. Panel analysis

	Hours Per Adult	Hours Per Worker	Employment Rate	Prime Aged	Prime-Aged Men	Prime-Aged Women	Elderly
$\log 1-\tau(L)$	0.184***	0.297***	-0.077	0.005	0.048	-0.078	1.439***
	(0.071)	(0.049)	(0.063)	(0.063)	(0.056)	(0.102)	(0.282)
$\log 1-\tau(K)$	0.007	0.056***	-0.062***	-0.003	0.013	-0.038	0.235**
	(0.028)	(0.019)	(0.022)	(0.025)	(0.022)	(0.040)	(0.098)
$\log 1/(1+\tau(C))$	-0.242	-0.002	-0.098	-0.274	-0.132	-0.429	-0.432
	(0.238)	(0.135)	(0.164)	(0.209)	(0.201)	(0.363)	(0.592)
Log GDP Per Adult	0.106***	0.061***	0.045**	0.098***	0.155***	-0.002	-0.063
	(0.027)	(0.015)	(0.019)	(0.023)	(0.020)	(0.043)	(0.063)
Year	-0.002***	-0.003***	0.001**	-0.001	-0.005***	0.007***	0.008***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.002)
Social Protection/GDP	-0.013***	0.001	-0.013***	-0.010***	-0.011***	-0.011***	-0.024***
	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)	(0.008)
Health/GDP	0.003	0.009***	-0.006**	-0.003	-0.002	-0.020***	0.045***
	(0.004)	(0.003)	(0.003)	(0.004)	(0.004)	(0.007)	(0.011)
Other Expenditure/GDP	-0.000	-0.002***	0.002***	-0.000	-0.000	0.002	0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)
N	1849	1849	1849	1849	1849	1849	1849
Adjusted R2	0.93	0.91	0.92	0.89	0.92	0.95	0.93

Notes. This table reports results of regressions of various measures of hours worked (across columns) on tax rates on labor, capital, and consumption (as in main text Table 6) but adding government spending (relative to GDP) variables. Panel A is cross-country analysis and Panel B is panel analysis with country fixed effects. Hours worked are measured in log and tax rates in the log net-of-tax rate so that estimates can all be interpreted as elasticities of hours worked with respect to net-of-tax rates. Estimates are weighted by adult population size in each country to be representative. The sample in panel A covers 126 countries and 92% of the world adult population. Adding government spending variables reduces slightly (but not drastically) the elasticity of hours with respect to the net-of-labor income tax rate both in the cross-country regressions and in the panel regressions.

Table A.4: Cross-Country Determinants of Hours Worked

	(1) All Adults	(2) Prime-Aged Adults	(3) Prime-Aged Men	(4) Prime-Aged Women	(5) Young 15-19	(6) Elderly 60+
Log GDP Per Adult	0.161***	0.159***	0.099***	0.353**	0.385***	0.209**
	(0.042)	(0.036)	(0.021)	(0.141)	(0.131)	(0.093)
$\log 1-\tau(L)$	0.321*	0.254	0.383**	-0.241	-0.464	0.361
	(0.180)	(0.155)	(0.148)	(0.517)	(0.857)	(0.581)
$\log 1-\tau(K)$	0.173**	0.176***	0.170***	0.267	0.027	0.753**
	(0.071)	(0.066)	(0.060)	(0.164)	(0.391)	(0.303)
$\log 1/(1+\tau(C))$	-1.034**	-0.933**	-0.695**	-1.657	0.018	-2.062
	(0.442)	(0.380)	(0.350)	(1.499)	(1.905)	(1.802)
Social Protection/GDP	0.002	0.005	0.009*	-0.002	0.042	-0.056***
	(0.006)	(0.005)	(0.005)	(0.017)	(0.029)	(0.020)
Health/GDP	0.000	-0.003	-0.000	-0.014	-0.003	0.054**
	(0.008)	(0.007)	(0.007)	(0.023)	(0.047)	(0.026)
Other Expenditure/GDP	0.003	0.005***	0.004*	0.013*	0.002	-0.006
	(0.002)	(0.002)	(0.003)	(0.008)	(0.010)	(0.008)
Informal Employment	0.542***	0.479***	0.397***	0.844**	1.098*	1.147***
	(0.099)	(0.092)	(0.099)	(0.416)	(0.627)	(0.415)
Labor Regulations Index	-0.250***	-0.239***	-0.237***	-0.312	-1.013***	0.234
	(0.062)	(0.051)	(0.059)	(0.230)	(0.257)	(0.251)
Muslim/Hindu Share	-0.152***	-0.156***	0.039	-0.757***	-0.201	-0.116
	(0.035)	(0.031)	(0.039)	(0.154)	(0.125)	(0.110)
Former Communist Country	0.094**	0.122***	-0.002	0.265**	-0.095	-0.314*
	(0.037)	(0.031)	(0.038)	(0.105)	(0.185)	(0.164)
Young School Attendance	-0.491***	-0.365***	-0.557***	-0.072	-5.119***	0.146
	(0.093)	(0.085)	(0.089)	(0.288)	(0.610)	(0.332)
Young Population Share	-5.017***	-2.109	0.982	-9.879	-10.630	-1.516
	(1.657)	(1.366)	(1.578)	(6.541)	(7.042)	(7.887)
Elderly Population Share	-0.394	0.450	0.845**	-0.977	-2.706	1.735
	(0.526)	(0.425)	(0.412)	(1.531)	(3.040)	(1.856)
Employment: Agriculture	0.254	0.216	0.137	0.516	0.911	-0.031
	(0.161)	(0.156)	(0.100)	(0.510)	(0.585)	(0.462)
Employment: Manufacturing	-0.969***	-0.874***	0.521*	-3.648***	-0.821	-3.977***
	(0.310)	(0.293)	(0.267)	(1.158)	(1.419)	(1.379)
N	119	119	119	119	119	119
Adjusted R2	0.83	0.82	0.84	0.78	0.75	0.84

Notes. This table reports results from cross-country regressions of average log-hours of work among different groups on all the key determinants that have been studied separately in the main text table. Combining all variables generates coefficients that are similar to partial analysis. The elasticity of hours with respect to GDP comes out consistently positive and significant for all groups.

Table A.5: Latest Survey Year, Information on Hours Worked, and Coverage of Auxiliary Variables

Country	Last Survey Year	Hours Worked Reporting	Industry	School Attendance	Household Structure	Pension Coverage	Pension Spending	Tax Rates	Public Spending
Afghanistan	2014	Actual	x	x	x			x	x
Albania	2019	?	x	x	x	x	x	x	x
Angola	2019	Actual	x	x	x	x	x		x
Argentina	2022	Actual	x	x	x	x	x	x	x
Armenia	2022	Actual	x	x	x	x	x	x	x
Australia	2019	Usual	x	x	x		x	x	x
Austria	2022	Actual	x	x	x	x	x	x	x
Azerbaijan	2015	?	x		x		x	x	x
Bangladesh	2022	Actual	x	x	x	x	x	x	x
Barbados	2016	Actual	x	x	x			x	x
Belarus	2016	?	x		x	x		x	x
Belgium	2022	Actual	x	x	x	x	x	x	x
Belize	2019	Actual	x	x	x			x	x
Benin	2018	Usual	x	x	x	x	x	x	x
Bhutan	2019	Actual	x	x	x	x	x		x
Bolivia	2019	Usual	x	x	x	x	x	x	x
Bosnia-Herz.	2016	Actual	x	x	x			x	x
Botswana	2019	Actual	x	x	x	x	x	x	x
Brazil	2022	Actual	x	x	x	x	x	x	x
Brunei D.	2014	Actual	x	x	x				x
Bulgaria	2022	Actual	x	x	x	x	x	x	x
Burkina Faso	2018	Usual	x	x		x	x	x	x
Burundi	2014	Actual	x	x	x			x	x
Cabo Verde	2015	Usual	x	x	x	x	x		x
Cambodia	2019	Actual	x	x	x		x	x	x
Cameroon	2014	Usual	x	x	x	x	x	x	x
Canada	2022	Actual	x	x			x	x	x
Cent. Afr. Rep.	2008	?	x	x	x		x	x	x
Chad	2018	Usual	x	x	x	x	x	x	x
Chile	2022	Actual	x	x	x	x	x	x	x
China	2013	Actual	x	x	x	x	x	x	x
Colombia	2022	Actual	x	x	x	x	x	x	x
Comoros	2014	Actual	x	x	x	x			x
Costa Rica	2023	Actual	x	x	x	x	x	x	x
Cote d'Ivoire	2019	Actual	x	x	x	x	x	x	x
Croatia	2022	Actual	x	x	x	x		x	x
Cyprus	2022	Actual	x	x	x	x		x	x
Czech Republic	2022	Actual	x	x	x	x	x	x	x
DR Congo	2012	Actual	x	x	x	x	x	x	x
Denmark	2022	Actual	x	x	x	x	x	x	x
Djibouti	2012	?	x	x	x	x			x
Dominican Rep.	2022	Actual	x	x	x	x	x	x	x
Ecuador	2022	Actual	x	x	x	x	x	x	x
Egypt	2022	Actual	x	x	x		x	x	x

El Salvador	2022	Actual	x	x	x	x	x	x	x
Estonia	2022	Actual	x	x	x	x	x	x	x
Ethiopia	2013	Actual	x	x	x	x	x	x	x
Finland	2022	Actual	x	x	x	x	x	x	x
France	2022	Actual	x	x	x	x	x	x	x
Gabon	2017	?	x	x	x		x	x	x
Gambia	2023	Actual	x	x		x	x	x	x
Georgia	2022	Actual	x		x	x		x	x
Germany	2022	Actual	x	x	x	x	x	x	x
Ghana	2017	Actual	x	x	x		x	x	x
Greece	2022	Actual	x	x	x	x	x	x	x
Guatemala	2019	Usual	x	x	x	x	x	x	x
Guinea	2012	?	x	x	x	x		x	x
Guinea-Bissau	2018	Usual	x	x			x		x
Guyana	2019	Actual	x	x	x			x	x
Haiti	2012	?	x	x	x	x		x	x
Honduras	2019	Actual	x	x	x	x	x	x	x
Hungary	2022	Actual	x	x	x	x	x	x	x
Iceland	2022	Actual	x	x		x	x	x	x
India	2022	Actual	x	x	x			x	x
Indonesia	2022	Actual	x	x		x	x	x	x
Iran	2022	?		x	x		x	x	x
Iraq	2012	?	x	x	x	x	x		x
Ireland	2022	Actual	x	x	x	x	x	x	x
Israel	2019	?	x				x	x	x
Italy	2022	Actual	x	x	x	x	x	x	x
Jamaica	2014	Actual	x	x	x		x	x	x
Japan	2019	?	x				x	x	x
Jordan	2019	Actual	x	x	x	x	x	x	x
Kazakhstan	2016	Usual			x	x		x	x
Kenya	2016	Actual		x	x	x	x	x	x
Korea	2017	?	x	x			x	x	x
Kosovo	2014	?	x	x	x		x	x	x
Kyrgyzstan	2019	?	x	x	x	x	x	x	x
Lao PDR	2010	Actual	x	x	x	x	x	x	x
Latvia	2022	Actual	x	x	x	x	x	x	x
Lebanon	2019	Actual	x	x	x		x	x	x
Lesotho	2019	Actual	x	x		x	x	x	x
Liberia	2010	Actual	x	x	x	x	x	x	x
Lithuania	2022	Actual	x	x	x	x	x	x	x
Luxembourg	2022	Actual	x	x	x	x	x	x	x
Macedonia	2017	?	x	x	x		x	x	x
Madagascar	2015	Actual	x	x	x			x	x
Malawi	2013	Actual	x	x	x	x	x	x	x
Malaysia	2010	?	x	x	x		x	x	x
Maldives	2019	Actual	x	x	x	x	x		x
Mali	2018	Actual	x	x	x	x		x	x
Malta	2022	Actual	x	x	x	x	x		x
Mauritania	2019	Actual	x	x	x		x	x	x

Mauritius	2019	Actual	x	x	x	x		x	x
Mexico	2022	Actual	x	x	x	x	x	x	x
Moldova	2019	Actual	x	x	x	x		x	x
Mongolia	2022	Actual	x	x	x	x	x	x	x
Montenegro	2016	Usual	x		x		x		x
Morocco	2018	Actual	x	x	x		x	x	x
Mozambique	2014	Actual	x	x	x	x	x	x	x
Myanmar	2019	Actual	x	x	x	x	x	x	x
Namibia	2018	Actual	x	x	x	x	x	x	x
Nepal	2008	Actual	x	x	x	x	x	x	x
Netherlands	2022	Actual	x	x	x	x	x	x	x
Nicaragua	2014	Usual	x	x	x	x	x	x	x
Niger	2012	Usual	x		x	x		x	x
Nigeria	2013	Actual	x	x	x	x	x	x	x
Norway	2022	Actual	x	x	x	x	x	x	x
Pakistan	2018	Actual	x	x	x	x	x	x	x
Palestine	2019	Actual	x	x	x	x	x		x
Panama	2022	Actual	x	x	x	x	x	x	x
Paraguay	2019	Actual	x	x	x	x		x	x
Peru	2019	Actual	x	x	x	x	x	x	x
Philippines	2022	Actual	x	x	x	x	x	x	x
Poland	2022	Actual	x	x	x	x	x	x	x
Portugal	2022	Actual	x	x	x	x	x	x	x
Rep. Congo	2011	?	x	x	x			x	x
Romania	2022	Actual	x	x	x	x	x	x	x
Russia	2019	Actual	x	x	x	x		x	x
Rwanda	2016	?	x	x	x	x		x	x
Samoa	2017	Actual	x	x	x			x	
Sao T. & P.	2017	?	x	x	x	x			x
Senegal	2018	Usual	x	x		x	x	x	x
Serbia	2019	Actual	x	x	x	x	x	x	x
Sierra Leone	2014	Actual	x	x	x	x		x	x
Slovakia	2022	Actual	x	x	x	x	x	x	x
Slovenia	2022	Actual	x	x	x	x	x	x	x
Somalia	2017	Actual	x	x	x				x
South Africa	2019	Actual	x	x	x	x	x	x	x
Spain	2022	Actual	x	x	x	x	x	x	x
Sri Lanka	2019	Actual	x	x	x	x	x	x	x
Sudan	2022	Actual	x	x	x			x	x
Suriname	2016	Actual	x	x	x				x
Swaziland	2016	Actual	x	x	x	x	x	x	x
Sweden	2022	Actual	x	x	x	x	x	x	x
Switzerland	2022	Actual	x	x		x	x	x	x
Syria	2003	?	x	x	x			x	x
Tajikistan	2013	?	x	x	x		x		x
Tanzania	2012	Usual	x	x				x	x
Thailand	2019	Actual	x	x	x	x	x	x	x
Timor-Leste	2016	Actual	x	x	x			x	x
Togo	2017	Usual	x	x		x	x	x	x

Tonga	2018	Actual	x	x	x	x			x
Tunisia	2015	?	x	x	x		x	x	x
Turkey	2019	Actual	x	x	x	x	x	x	x
UK	2019	Actual	x		x	x	x	x	x
USA	2023	Actual	x	x	x	x	x	x	x
Uganda	2017	Actual	x	x	x	x	x	x	x
Ukraine	2016	Usual			x		x	x	x
Uruguay	2022	Usual	x	x	x	x	x	x	x
Uzbekistan	2016	Usual			x		x	x	x
Vanuatu	2019	Actual	x	x	x				
Venezuela	2017	Actual	x	x	x			x	x
Vietnam	2019	Actual	x	x	x	x	x	x	x
Yemen	2014	Actual	x	x	x	x		x	x
Zambia	2012	Actual	x		x	x	x	x	x
Zimbabwe	2011	Actual	x	x	x			x	x