

# **Global Labor Hours in Paid & Unpaid Work: Productivity & Structural Transformation 1800-2100**

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

World Inequality Lab, Paris School of Economics  
June 2025

# What We Do in this Research

(1) We quantify the **global decline in labor hours 1800-2025, together with multiple transformations of gender patterns of work**

(2) We estimate a **large negative long-run elasticity between labour hours and productivity** (income effects > substitution effects) (Keynes 1930 "*Economic possibilities for our grand-children*"), but with substantial variations across countries & periods. At the global level, hourly productivity (NDP per work hour) rose from 0.5€ in 1800 to 15€ in 2025 (PPP 2025 €). In 2025, it ranges from 4€ in Subsaharan Africa to 55-60€ in USA, Germany or France.

**(3) On the basis of historical trends, we discuss several possible trajectories for labor hours, productivity, gender inequality and structural transformation over 2025-2100 period**

**In our "global convergence" scenario, hourly productivity could reach about 100€ in all countries by 2100**

**Viable only if this comes with substantial reduction in work hours, inequality & gender gaps and large sectoral reallocation of labour time away from the most polluting sectors**

**Complicated, but maybe less complicated than "business-as-usual" scenario: widening North-South inequality, enormous demographic & political pressures**

## Relation to the Literature

- (i) Large literature on the **determinants of global labour hours** (Bick et al 2018, 2022, Fuchs-Schundeln 2024, Gottlieb et al 2024). **Mostly focuses on recent decades.**
- (ii) Large literature on **history of labour hours since 1800** (Huberman 2004, 2007, Gilmore 2021, Goldin 1995, 2024). **Mostly focuses on Western countries.**

Main novelty: **we build a global historical database covering 57 core countries over 1800-2025 & use it for prospective analysis**

Our conclusions are consistent with literature (**negative elasticity with « country wedges »**) but offer new insights on long-run trends

**(1) Main long-run results: global decline in labor hours 1800-2025, together with multiple transformations of gender patterns of work**

Our historical series 1800-2025 focus on economic labour, but we also look at domestic labour 1960-2025 using time-use surveys

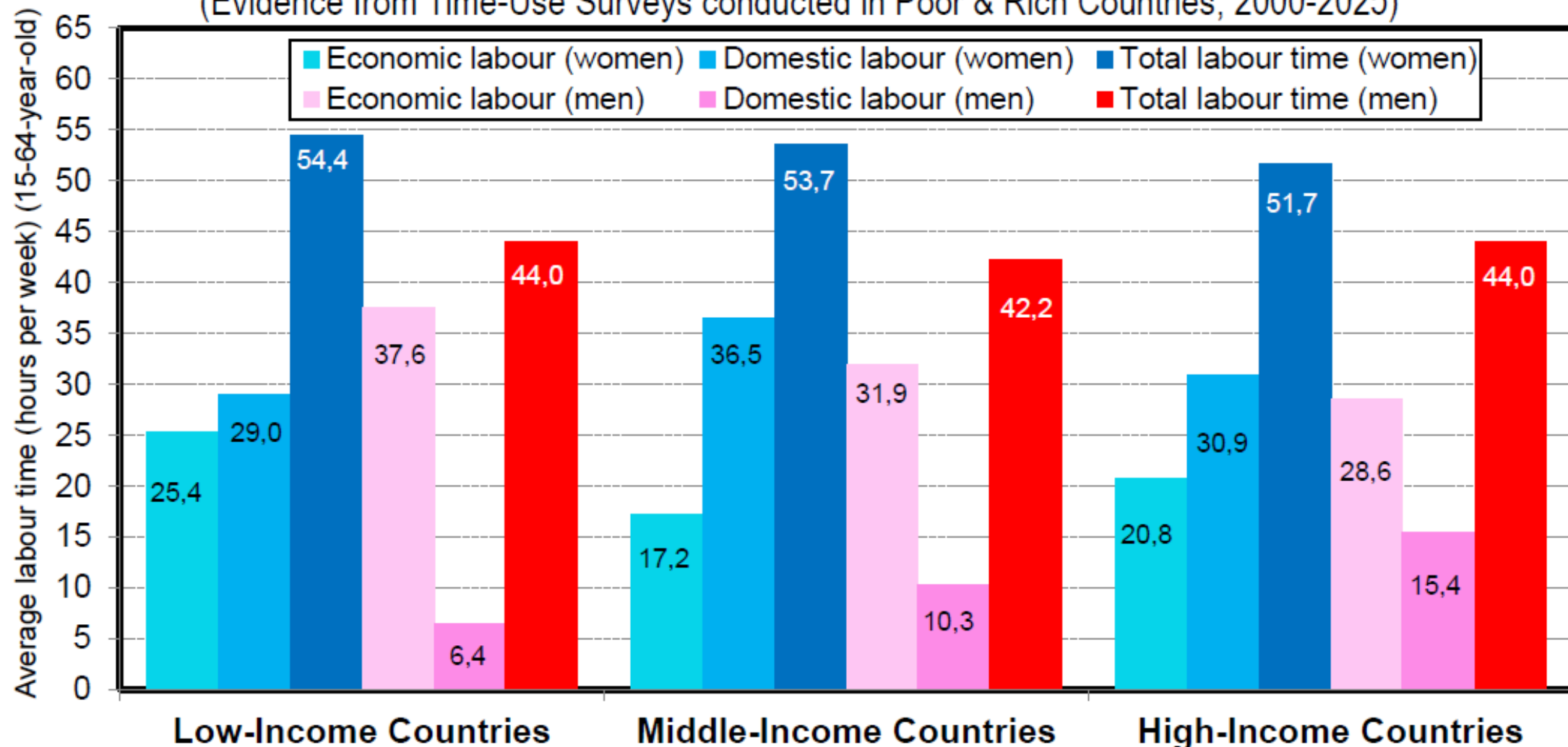
Our long-run series combine micro data (employment & time-use surveys) 1960-2025 with historical series 1800-1960 coming from industrial surveys (mostly manufacturing sector, but manufacturing and non-manufacturing work hours show consistent trends over time & across regions 1960-2025)

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

<b>Economic Labour</b>	<b>Domestic Labour</b>
Labour that is used as an input to produce <b>goods and services that are <u>included in national accounts</u></b>	Labour that is used as an input to produce <b>goods and services that are <u>not included in national accounts</u></b>
<b>Economic labour</b> includes many forms of <b>market &amp; non-market labour, formal &amp; informal labour, paid &amp; unpaid labour, etc.</b> Examples: <b>public school teachers or nurses/doctors</b> (valued at production costs); <b>unpaid family work in agriculture</b> (valued at output prices); etc.	<b>Domestic labour</b> also includes many different forms of labour, and in particular <b>housekeeping tasks</b> (cleaning, cooking, child-caring, etc), <b>unpaid volunteering and community work</b> , etc. This excludes self-care, education and leisure time.
<p>Note. Due to data limitations, the global historical labour hours database constructed in this paper focuses for the most part on economic labour. In effect, this is the only form of labour for which we can construct long-run series on labour hours and labour productivity covering two centuries (1800-2025) and a large set of countries. For recent decades (1960-2025), we also provide series on domestic labour for an incomplete set of countries based on time-use surveys.</p>	

## Fig. 1. Women Work More Than Men

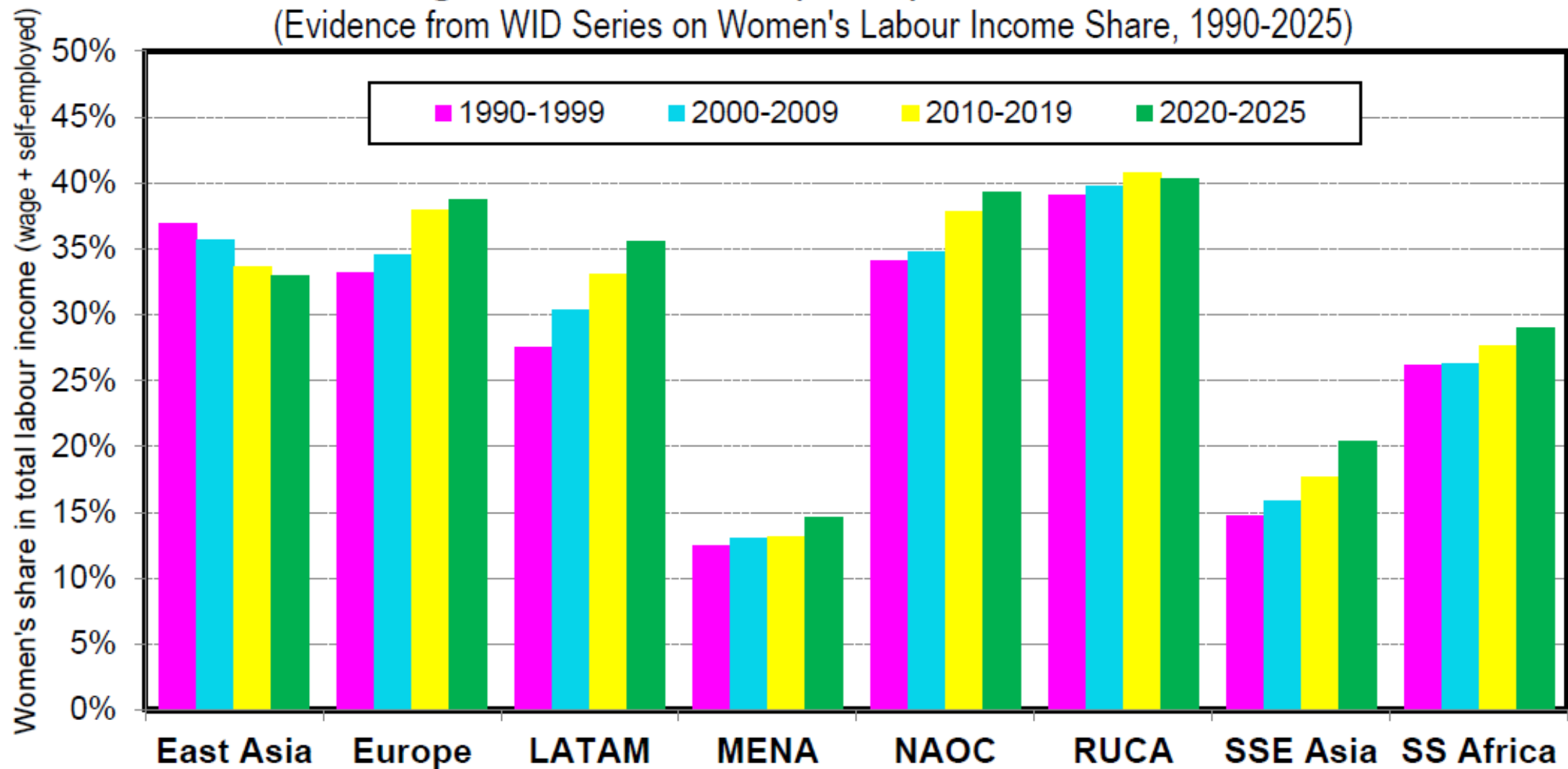
(Evidence from Time-Use Surveys conducted in Poor & Rich Countries, 2000-2025)



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

## Fig. 2. Women Earn (A Lot) Less Than Men

(Evidence from WID Series on Women's Labour Income Share, 1990-2025)



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

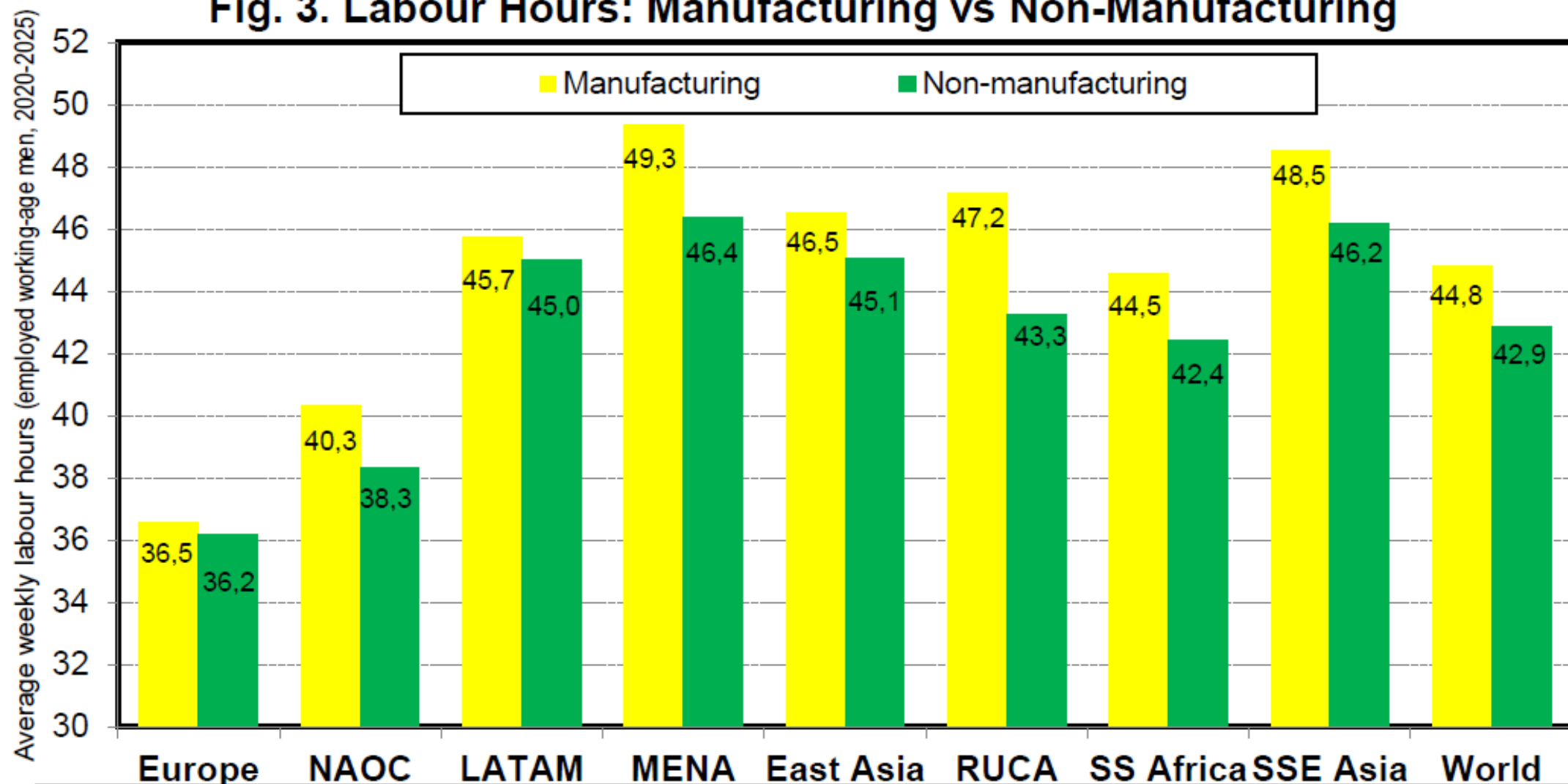


**Table 2. A New Global Labour Hours Database: Geographical Coverage**  
(57 core territories = 48 main countries + 9 residual regions)

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

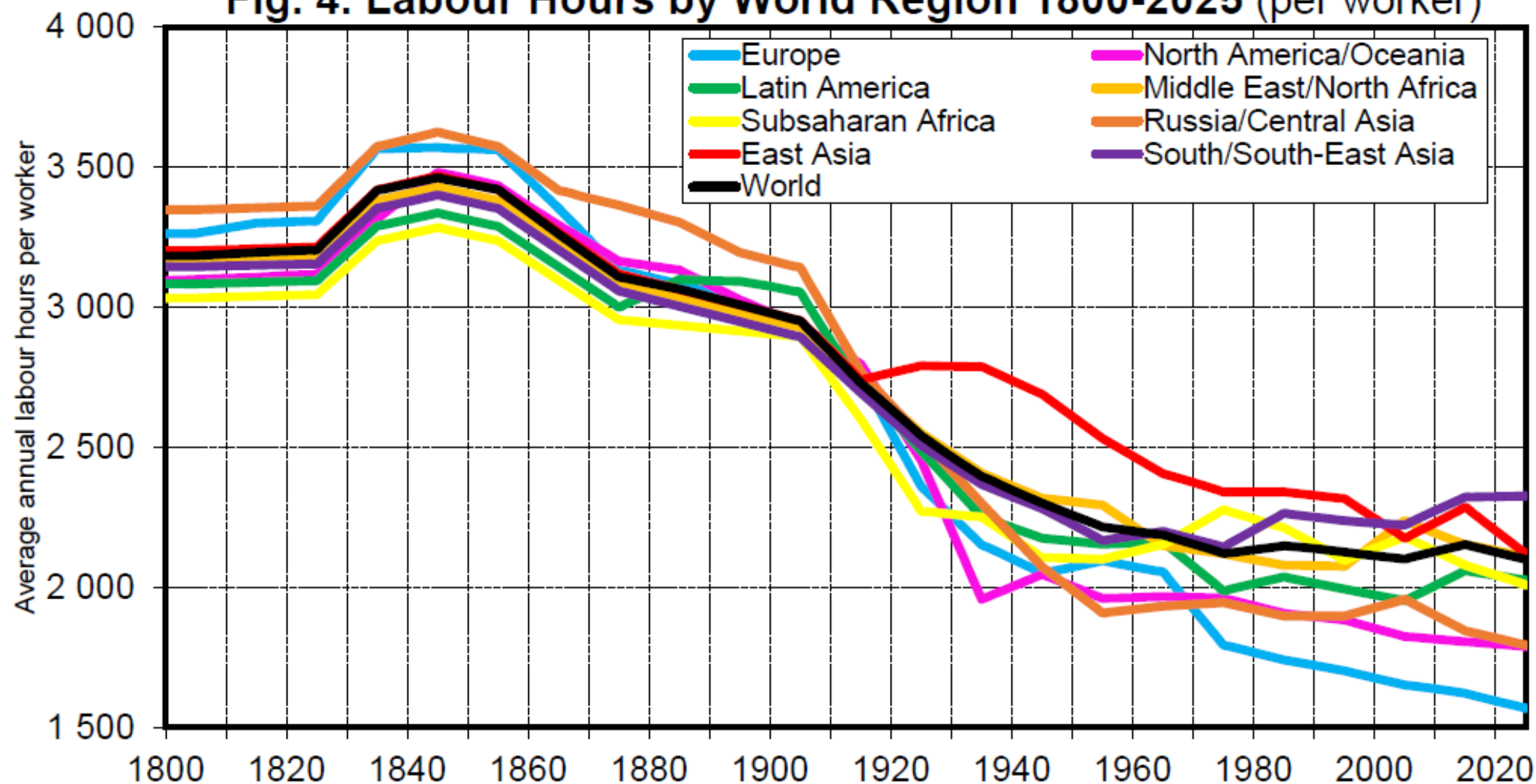
Interpretation. Our global historical database on labour hours aims to cover 57 core territories (48 main countries + 9 residual regions) over the 1800-2025 period. Whenever possible, we provide estimates for average annual working hours for working-age population (15-to-64-year-old) broken down by gender,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

**Fig. 3. Labour Hours: Manufacturing vs Non-Manufacturing**



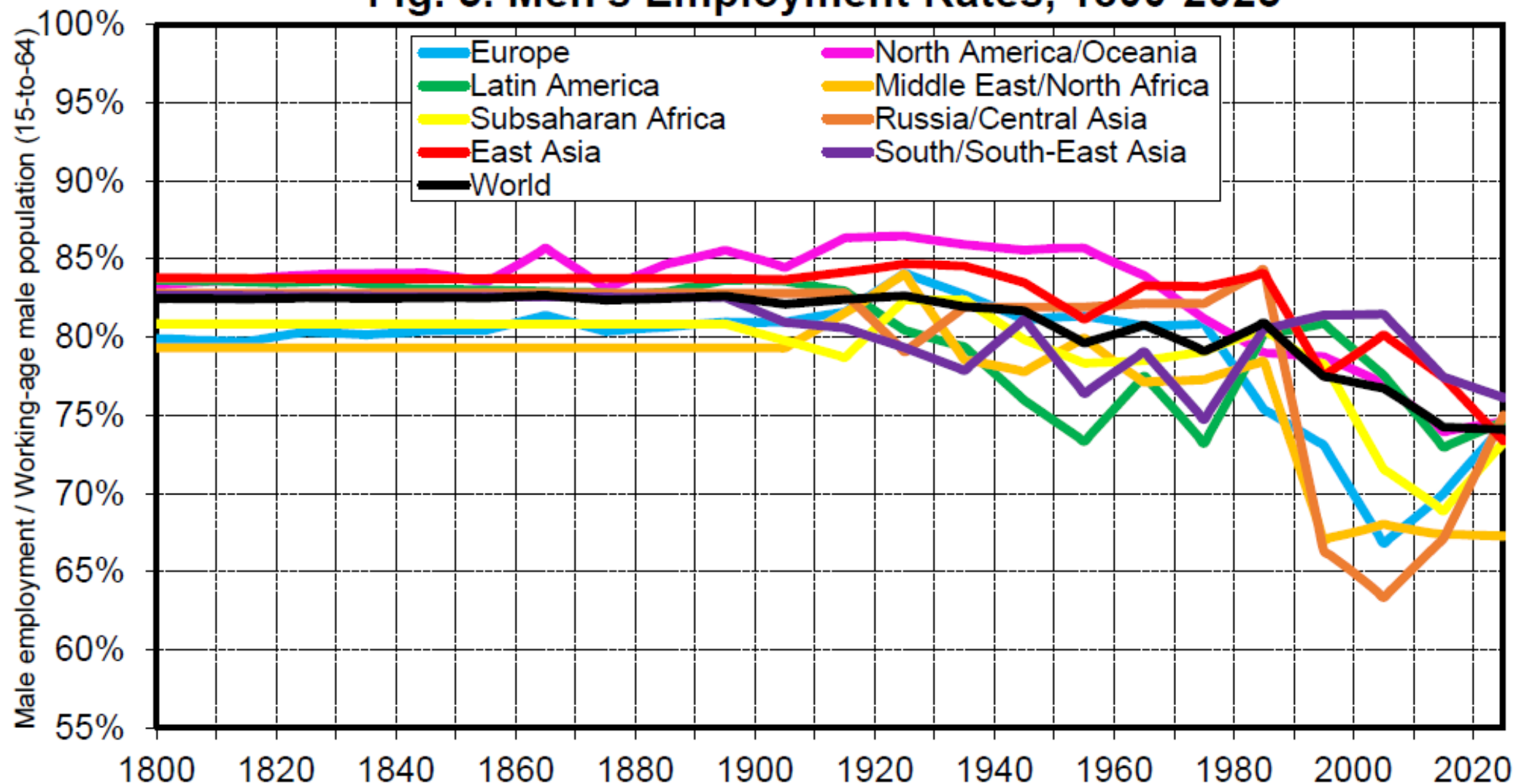
**Interpretation.** Average weekly economic labour hours are longer in the manufacturing sector than in the non-manufacturing sector, but the between-sector gap is relatively small as compared to the overall between-region gap. E.g. in Europe average weekly work hours for employed working age-men (15-to-64-year-old)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

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



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

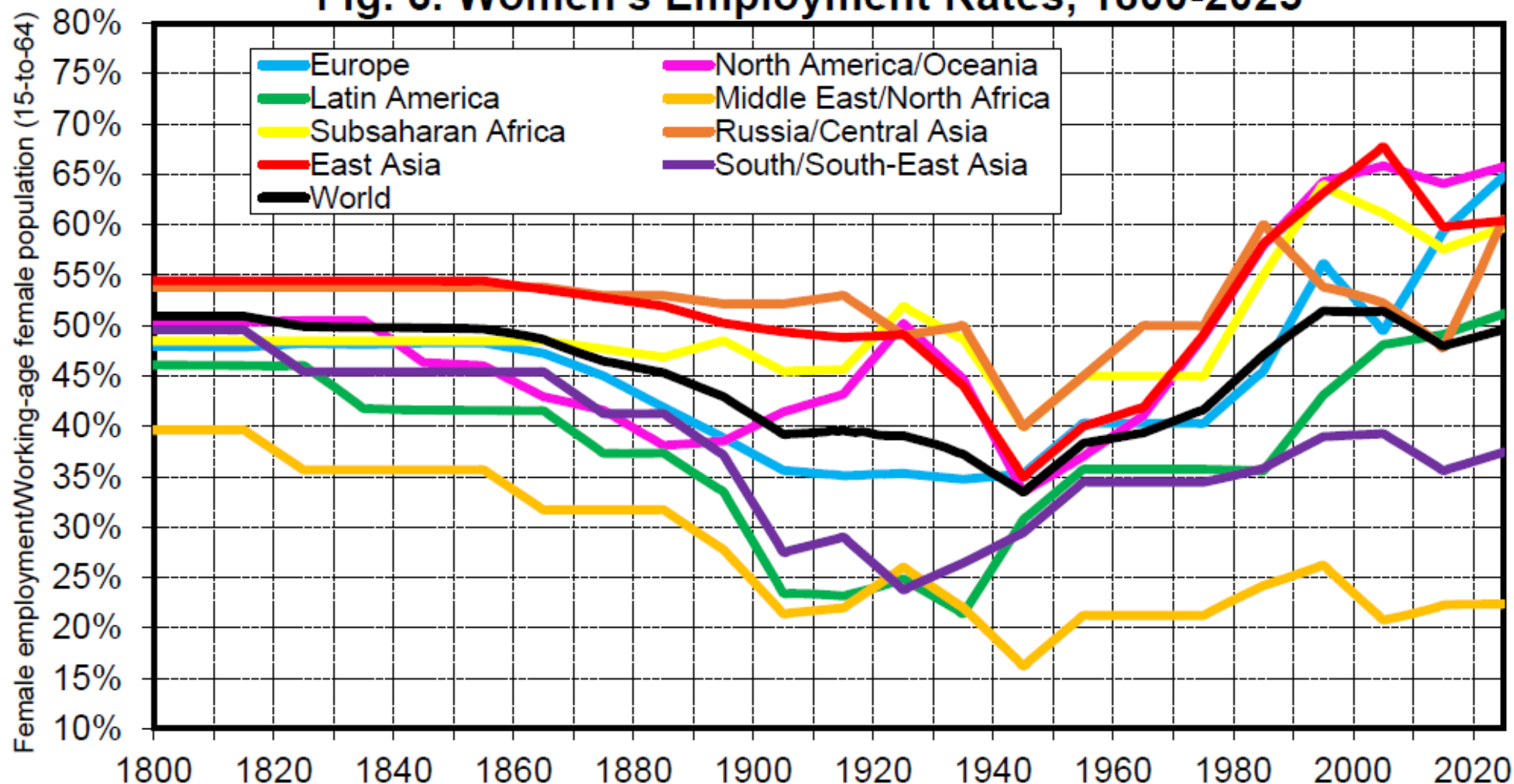
**Fig. 5. Men's Employment Rates, 1800-2025**



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



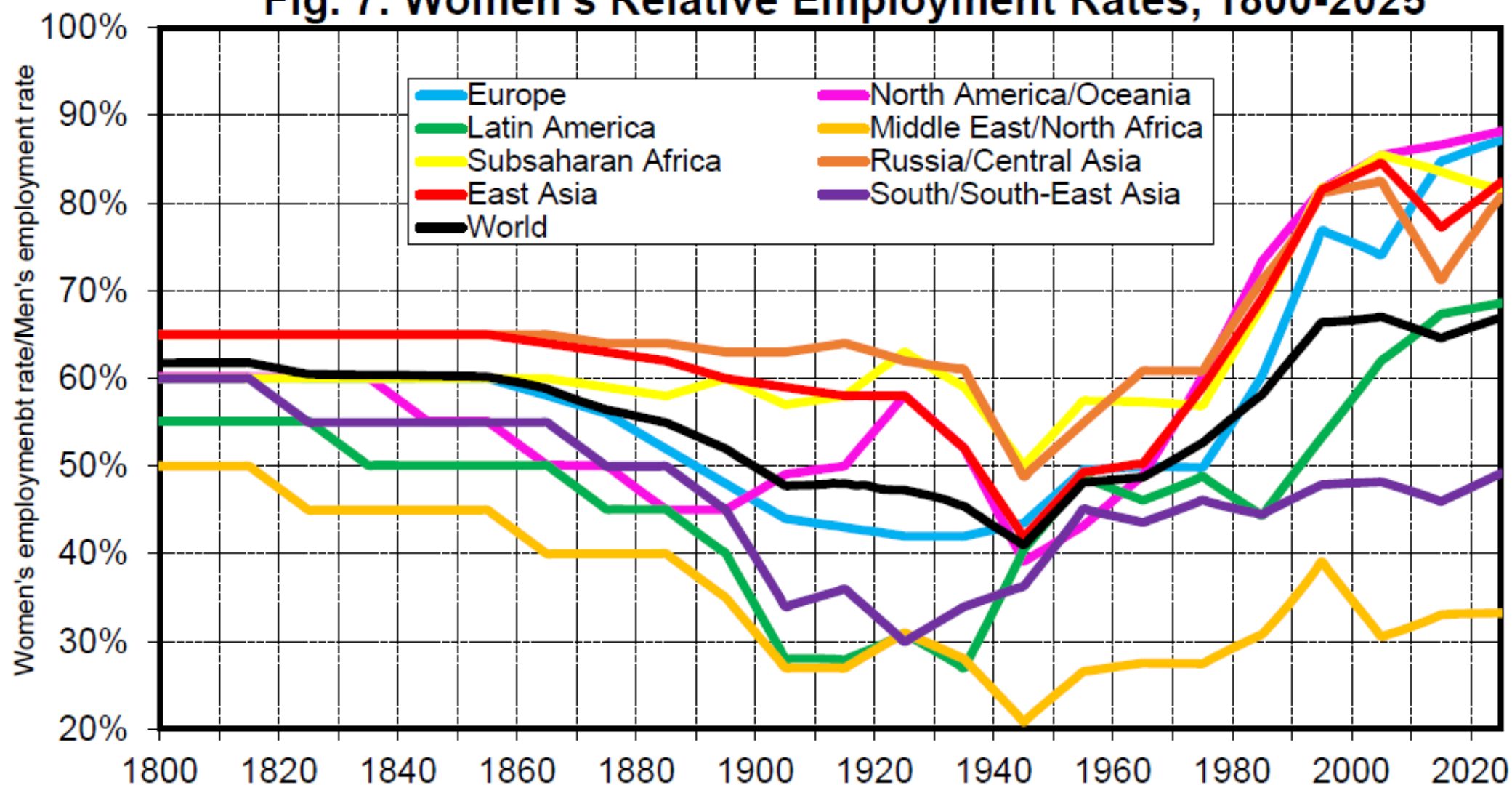
**Fig. 6. Women's Employment Rates, 1800-2025**



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

**Sources and series:** see [wid.world](http://wid.world)

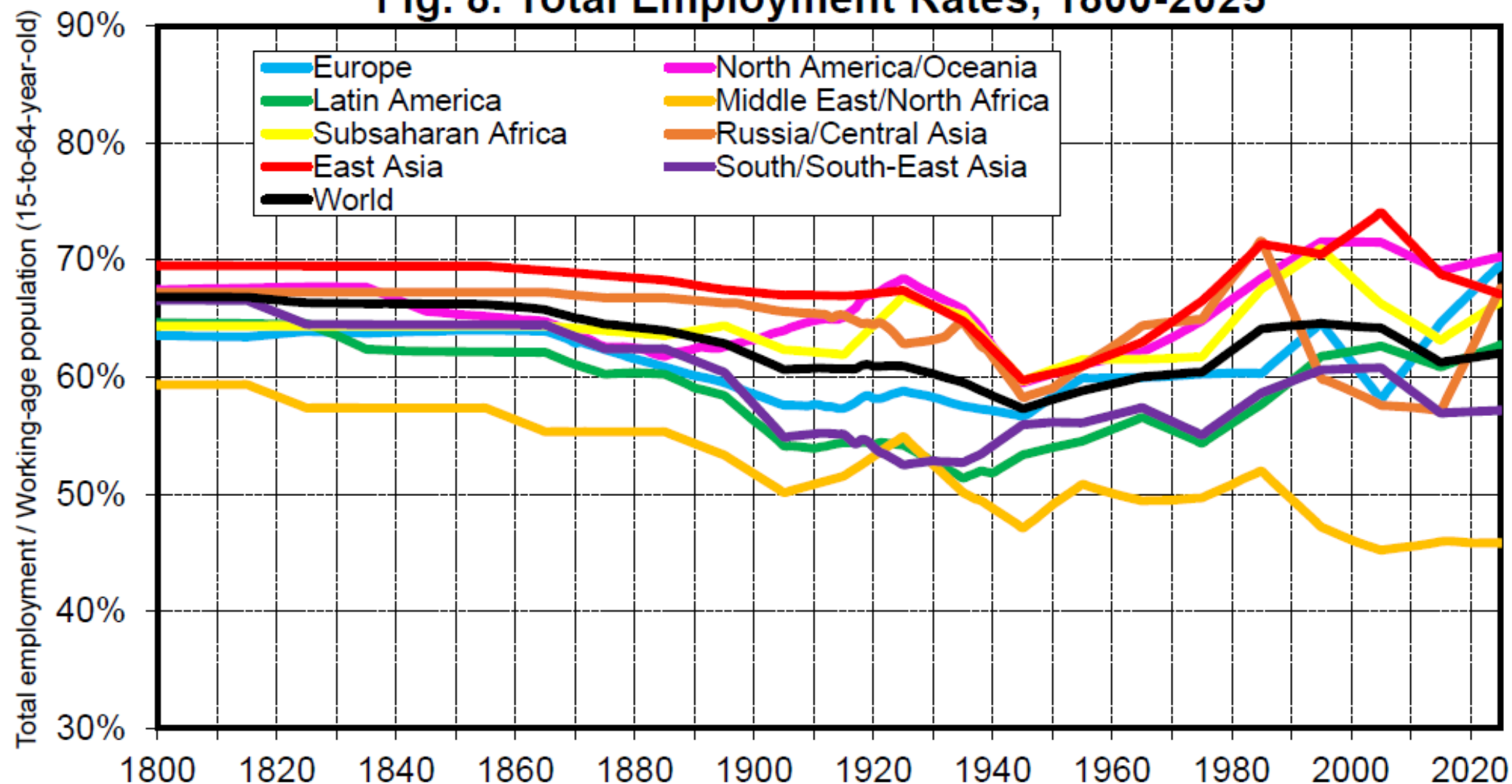
**Fig. 7. Women's Relative Employment Rates, 1800-2025**



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

**Sources and series:** see [wid.world](http://wid.world)

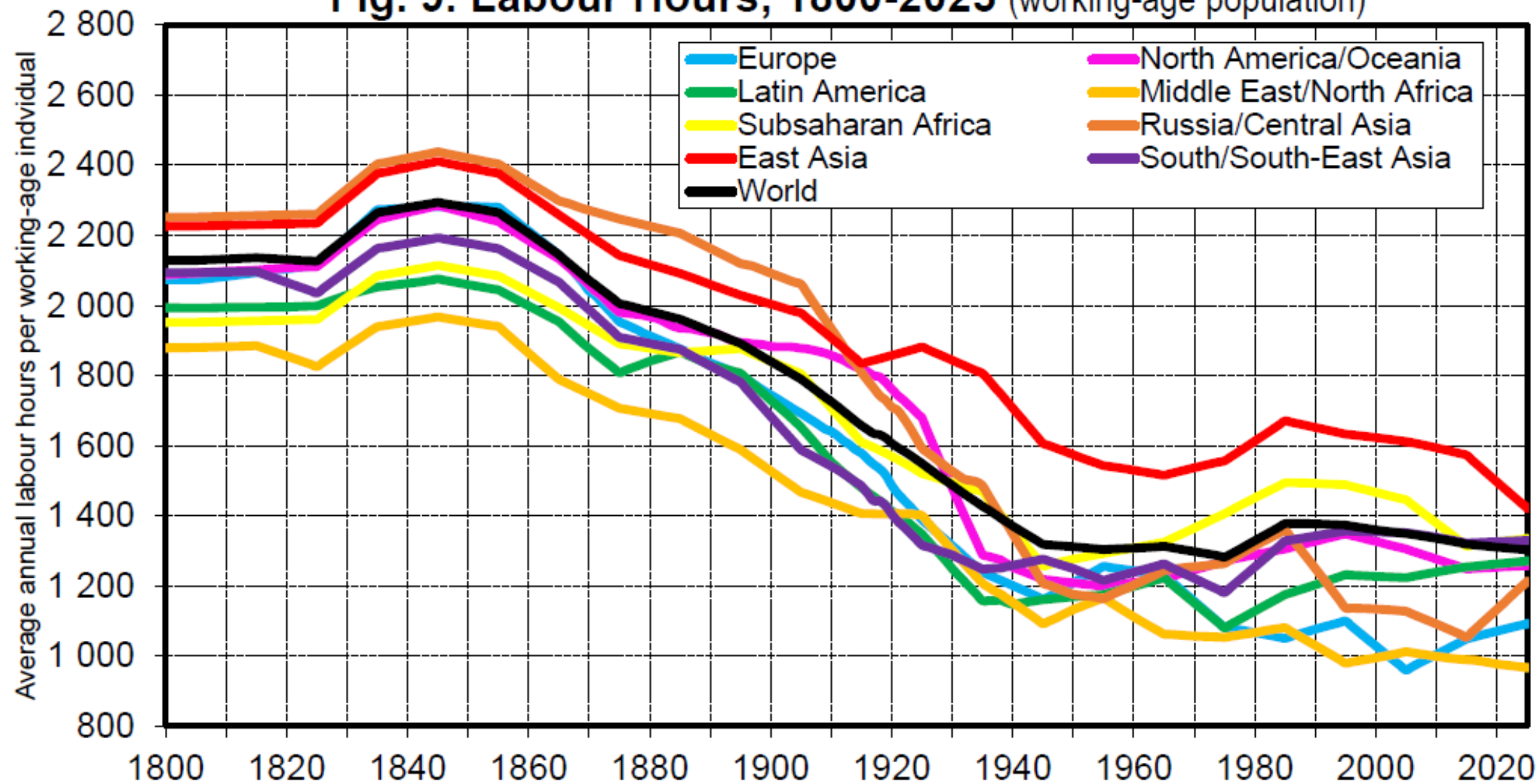
**Fig. 8. Total Employment Rates, 1800-2025**



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

**Sources and series:** see [wid.world](http://wid.world)

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



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



Summing up: **large decline in labor hours 1800-2025**

(per worker: from 3300h to 2100h, -37%)

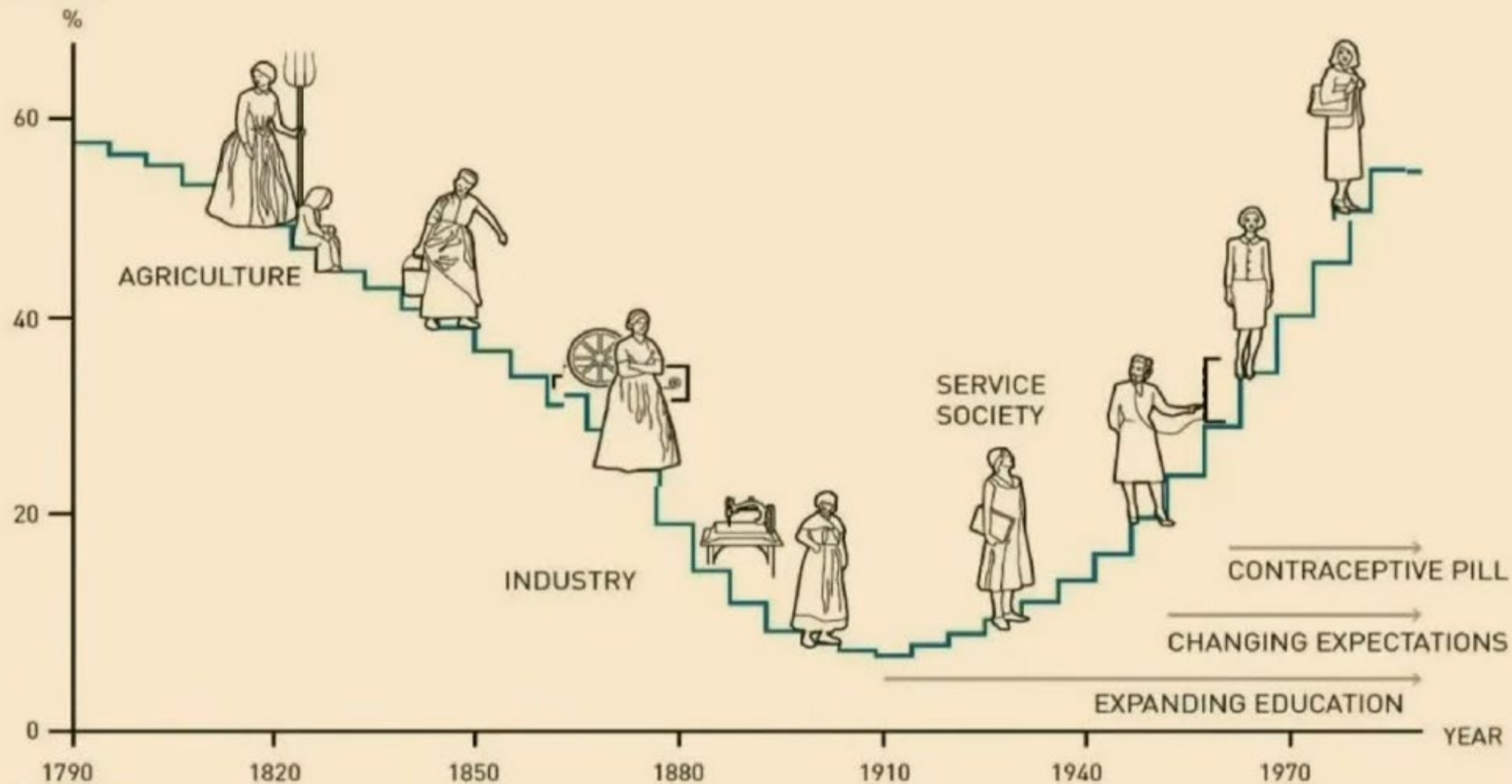
(per working-age individual: from 2200h to 1300h, -40%)

**But with large variations across periods/countries: main period of work time reduction = 1860-1980 rise of labor movement**

And with major changes in gender patterns: **U-shaped women employment rates** (key role of unpaid family work in agriculture),  
+ **very slow rise of men domestic labor** (large regional variations)

→ **History of labor time is socio-political, not just economic**

# MARRIED WOMEN IN WORK

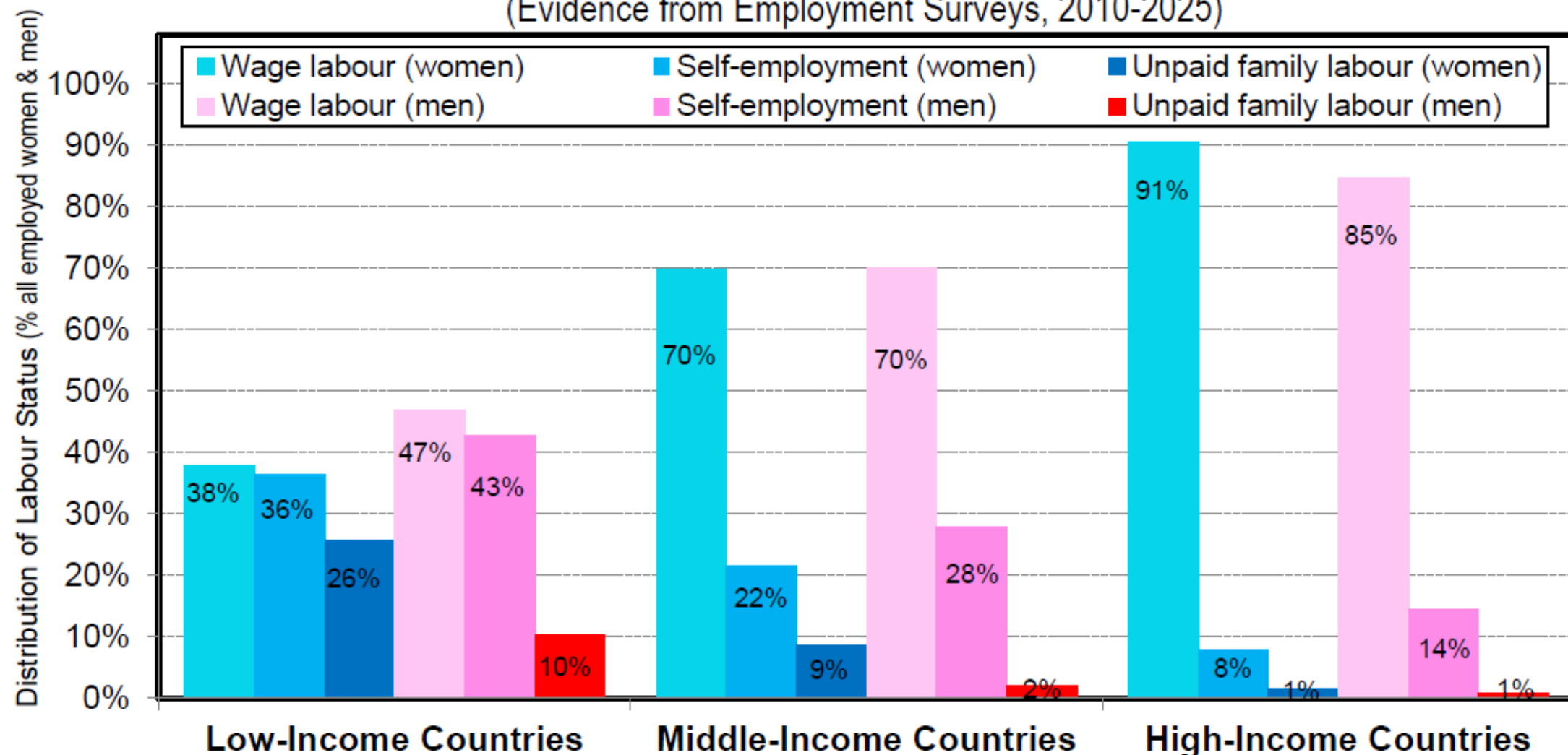


#nobelprize

THE  
NOBEL  
PRIZE

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

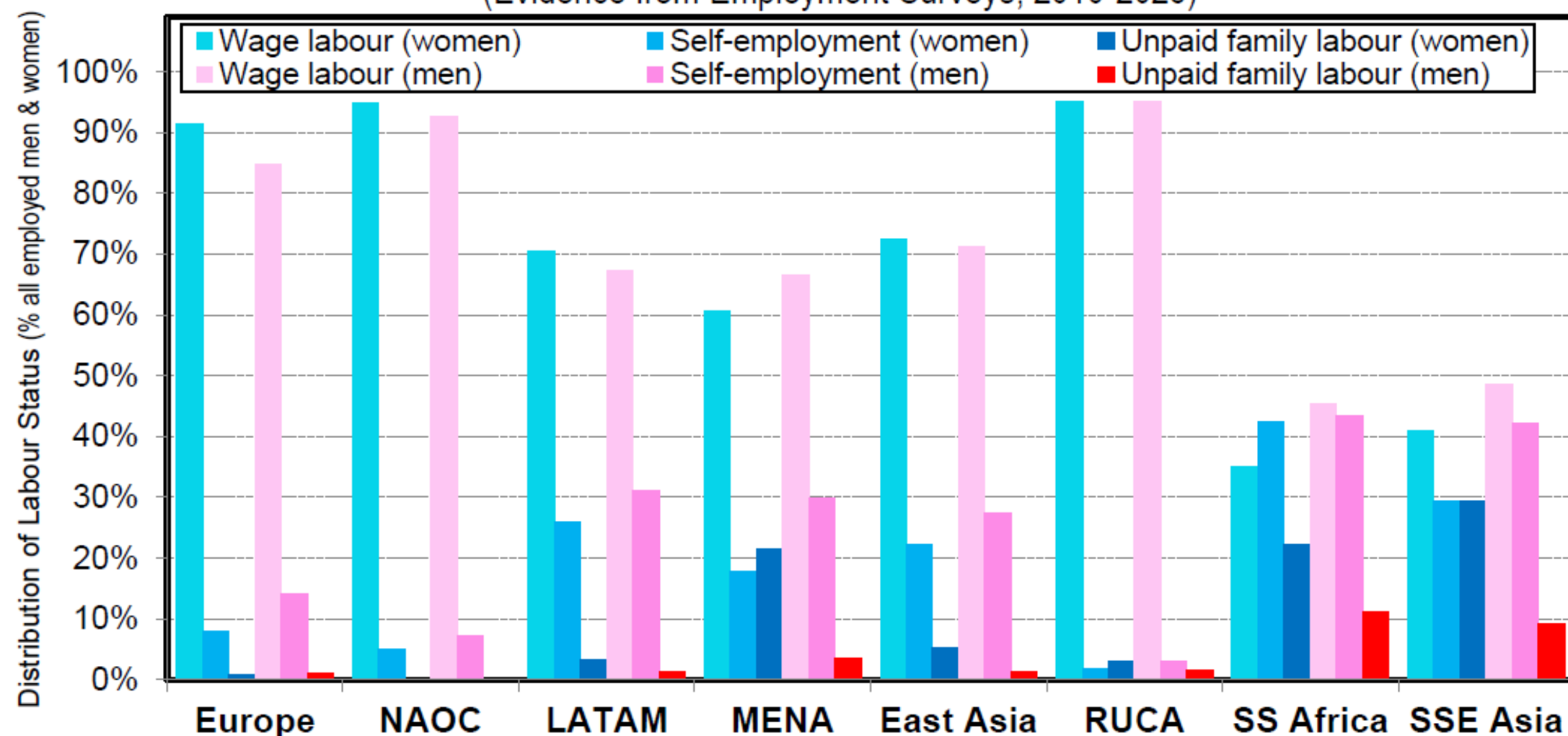
(Evidence from Employment Surveys, 2010-2025)



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

# Fig. 11. Labour Status & Gender Across Regions

(Evidence from Employment Surveys, 2010-2025)

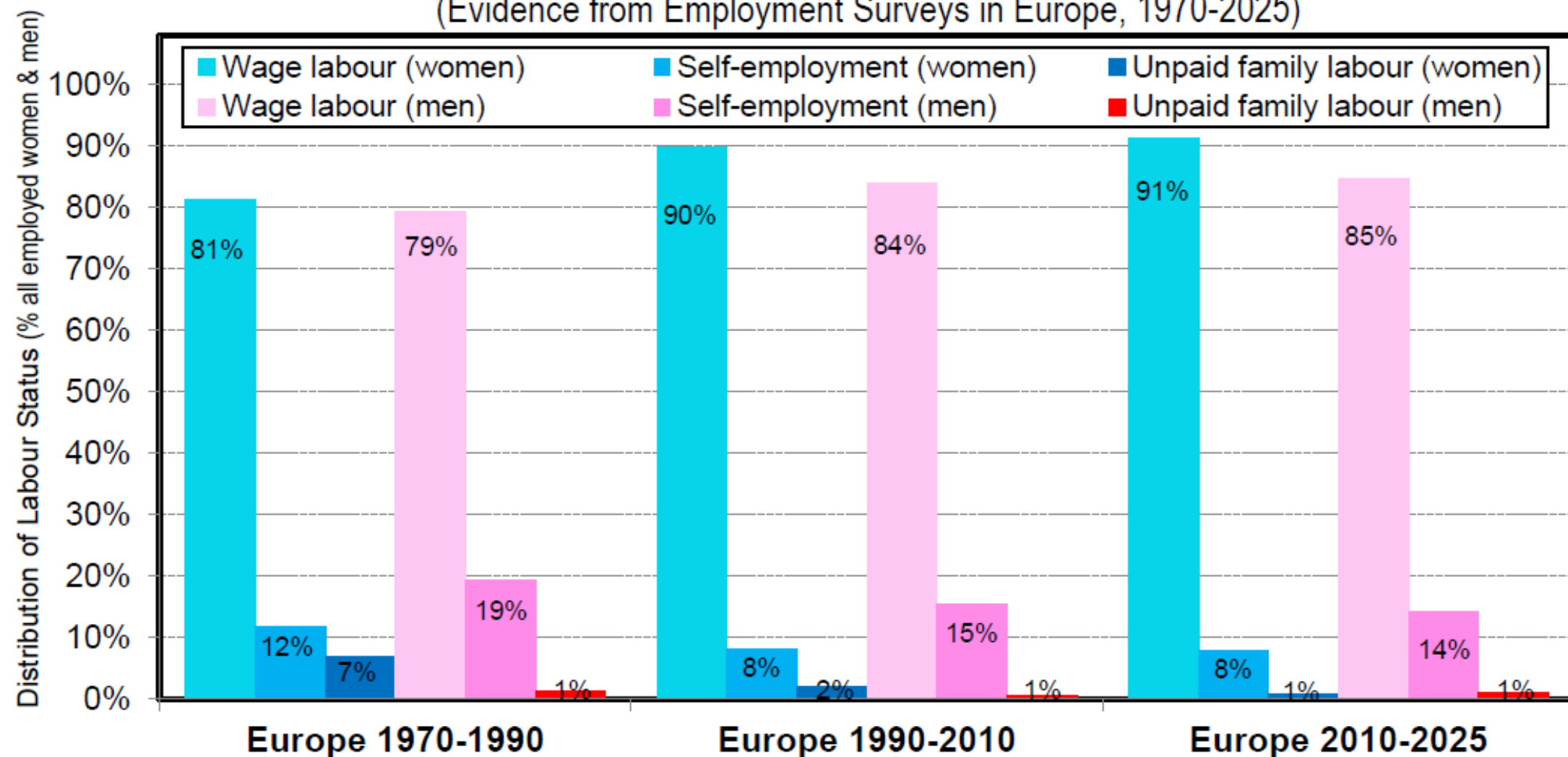


**Interpretation.** In 2010-2025, the proportion of unpaid family labour within employed women is particularly large in Middle East/North Africa (22%) Subsaharan Africa (22%) and South/South-East Asia (30%).

**Note.** Authors' computations using employment surveys from 35 countries. **Sources & series:** wid.world

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

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

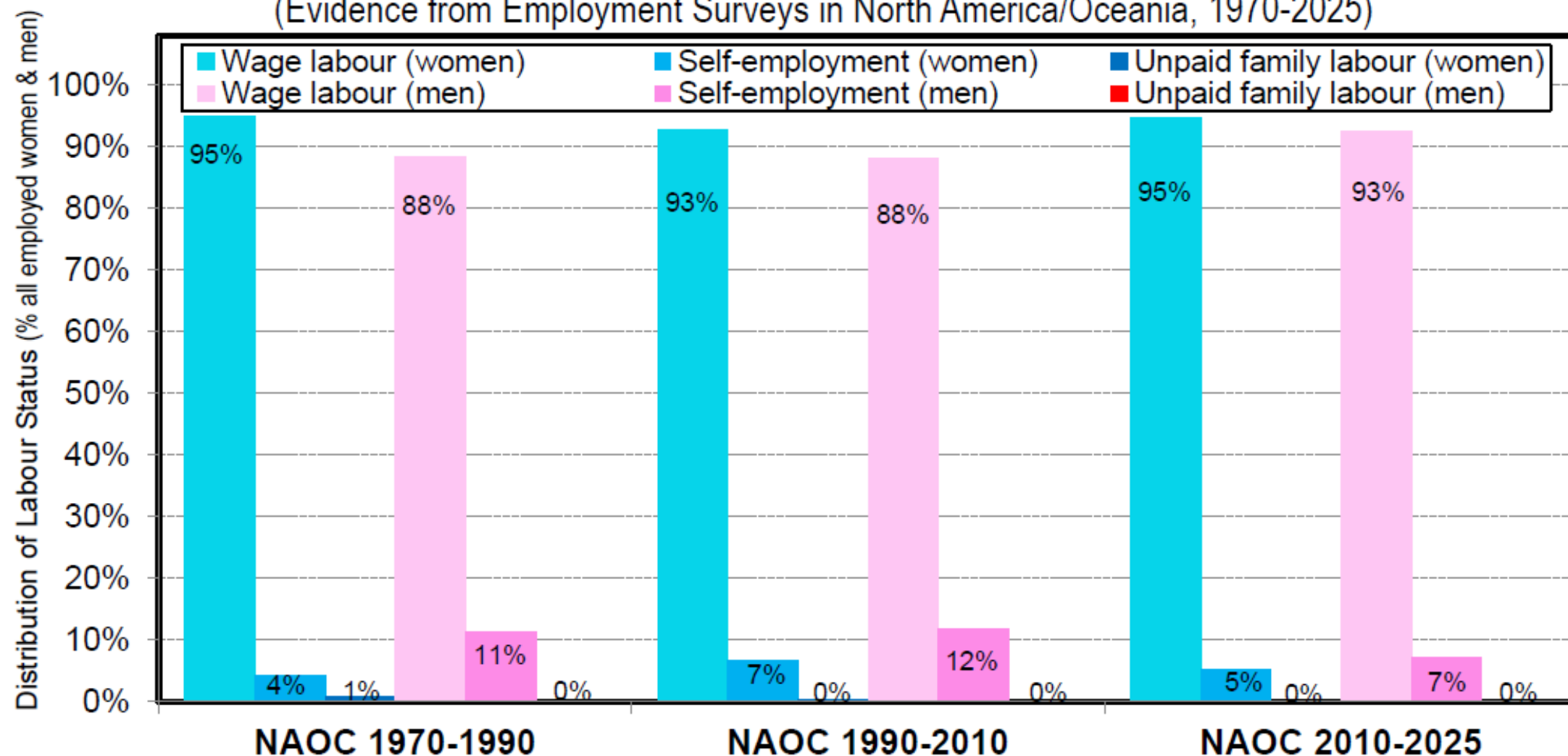


**Interpretation.** In 1970-1990, the proportion of unpaid family labour within employed women (7%) was comparable to middle-income countries in 2010-2025 (9%).

**Note.** Authors' computations using employmentsurveys run in Britain, Denmark, Italy, France, Germany and Spain over 1970-2025 period. **Sources & series:** wid.world

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

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



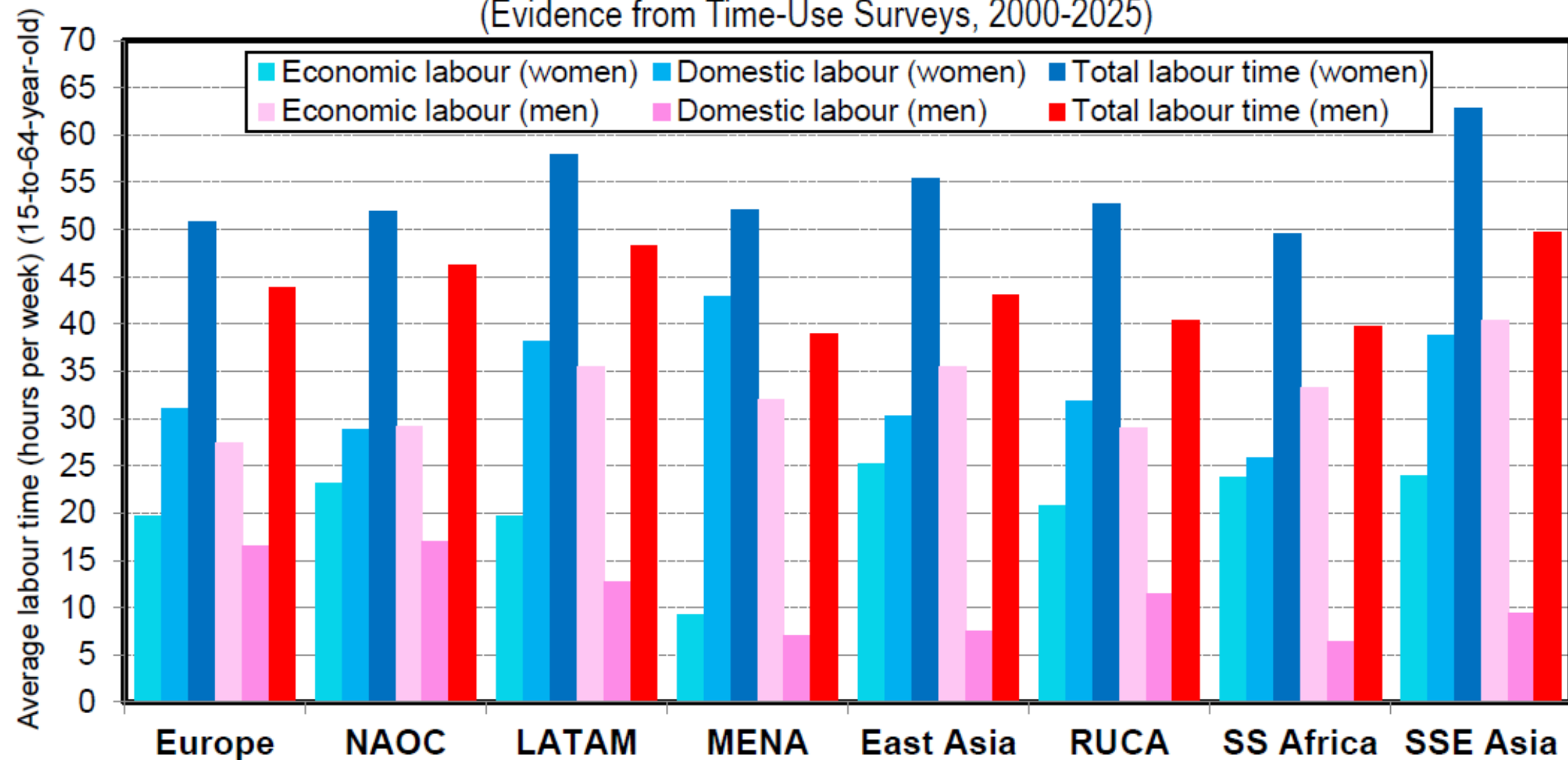
**Interpretation.** In 1970-1990, the proportion of unpaid family labour within employed women (1%) was already negligible in North America/Oceania, reflecting an early decline of the agricultural sector and other traditional family self-employment activities.

**Note.** Authors' computations using employmentsurveys run in USA, Canada, Australia and New Zealand over 1970-2025 period. **Sources & series:** wid.world



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

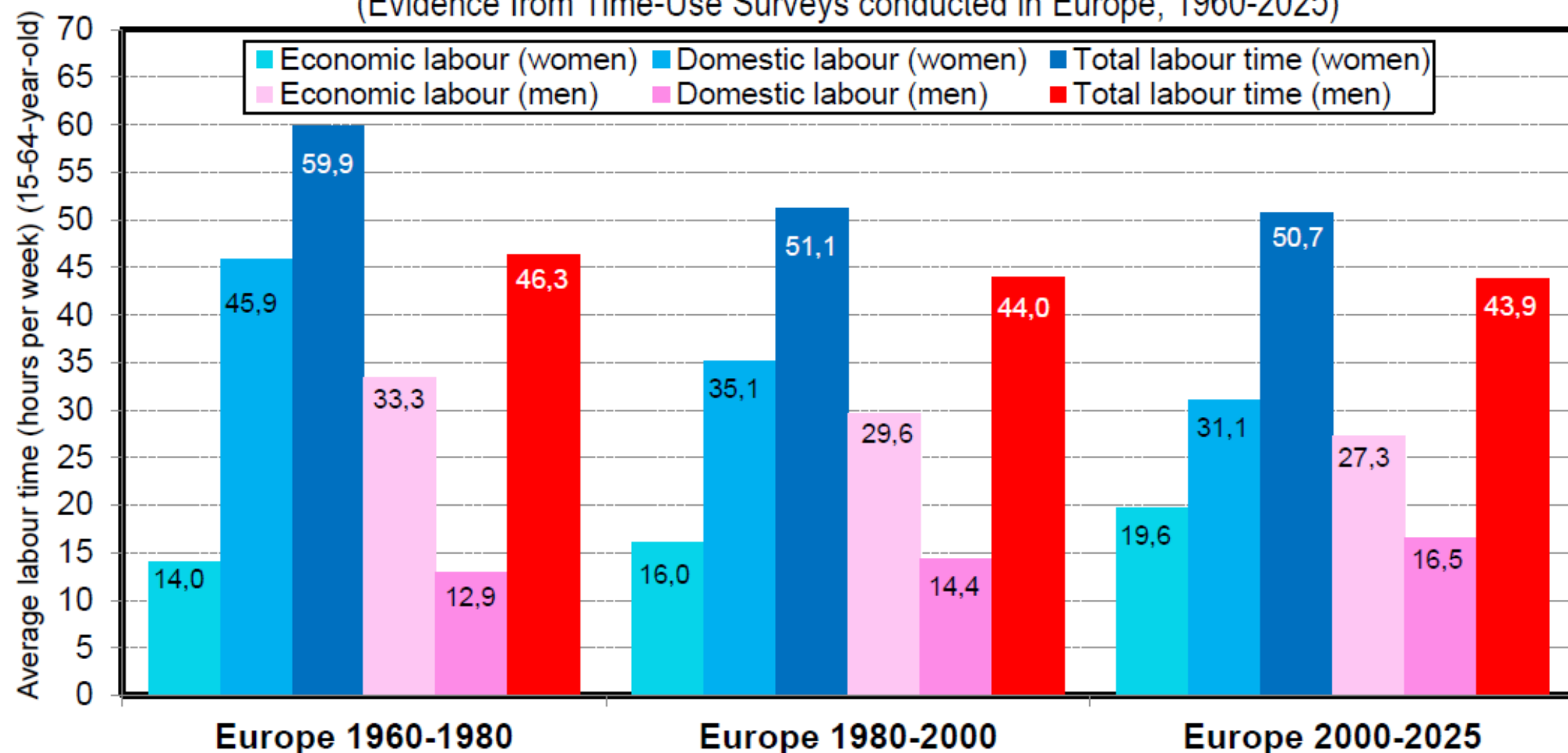
(Evidence from Time-Use Surveys, 2000-2025)



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

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

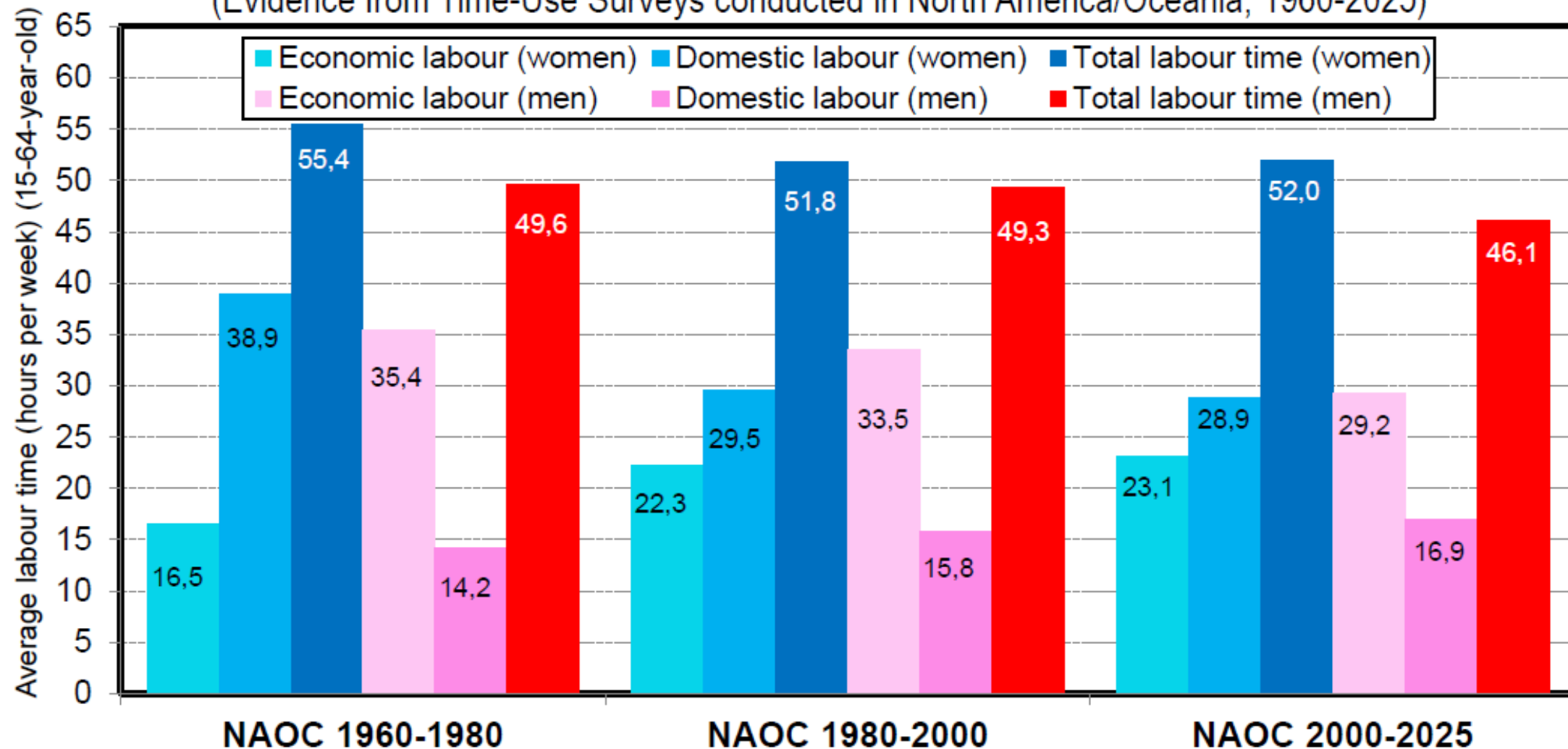
(Evidence from Time-Use Surveys conducted in Europe, 1960-2025)



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



**Fig. 16. Women Have Always Worked More Than Men: NAOC**  
(Evidence from Time-Use Surveys conducted in North America/Oceania, 1960-2025)



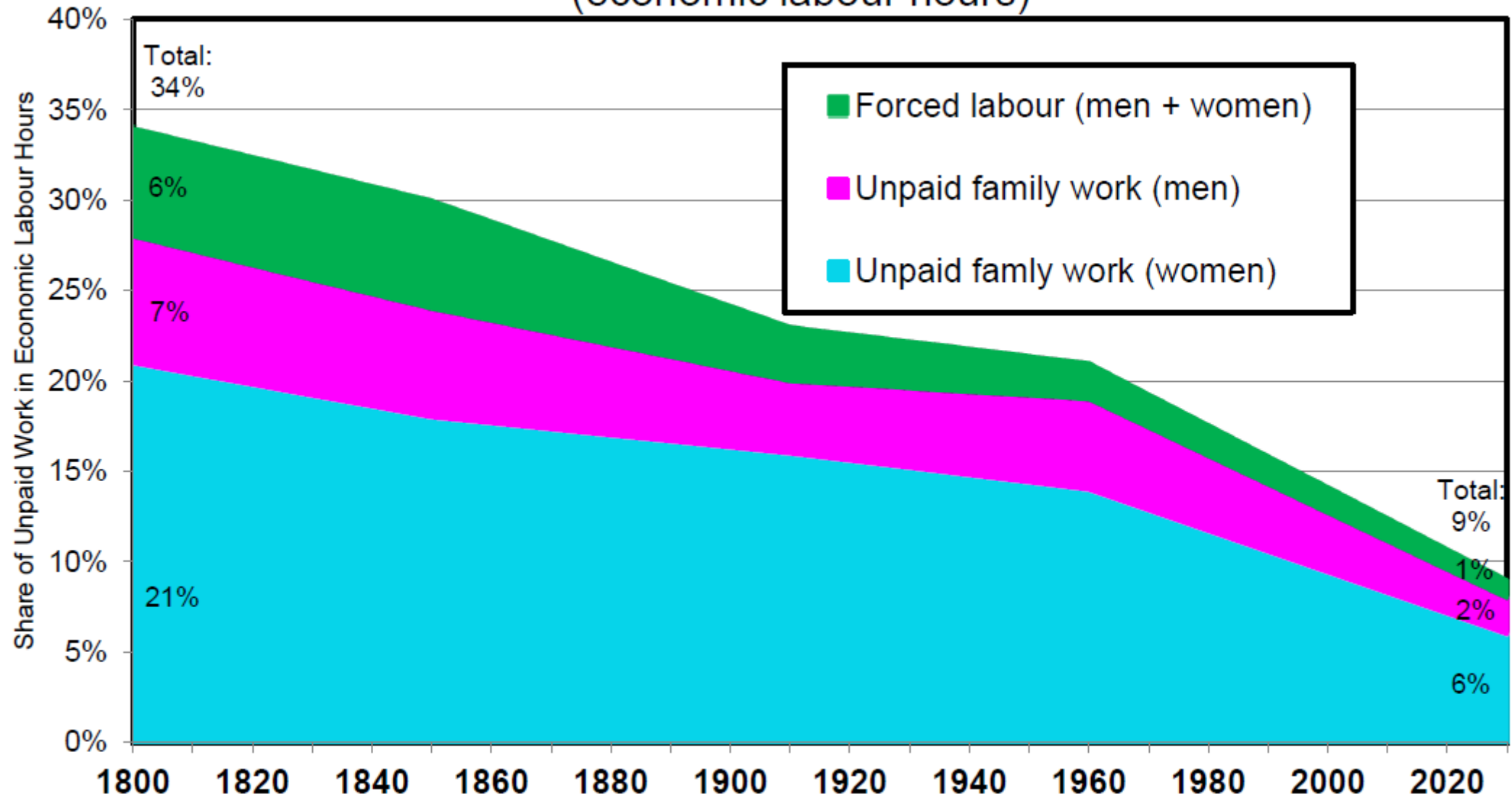
**Interpretation.** If we look at total labour time (economic + domestic), we find that women have always worked more men in North America and Oceania, with no reduction of the gap in recent decades. **Note.** Economic labour includes labour used to produce goods & services included in national accounts.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

**Table 3. Women Work Than Men: Summary Statistics**

Average labour time (hours per week) among all working-age individuals (15-to-64-year-old) (working or not)	Women			Men			Gender gap in total labour time		Women share in labour time		
	Economic Labour	Domestic Labour	Total Labour Time	Economic Labour	Domestic Labour	Total Labour Time	Absolute (W-M)	Relative (W-M)/M	Economic Labour	Domestic Labour	Total Labour Time
Low-Income Countries	25.4	29.0	<b>54.4</b>	37.6	6.4	<b>44.0</b>	<b>10.4</b>	24%	40%	82%	<b>55%</b>
Middle-Income Countries	17.2	36.5	<b>53.7</b>	31.9	10.3	<b>42.2</b>	<b>11.4</b>	27%	35%	78%	<b>56%</b>
High-Income Countries	20.8	30.9	<b>51.7</b>	28.6	15.4	<b>44.0</b>	<b>7.7</b>	17%	42%	67%	<b>54%</b>
All Countries 2000-2025	21.1	32.1	<b>53.2</b>	32.7	10.7	<b>43.4</b>	<b>9.8</b>	23%	39%	75%	<b>55%</b>
Europe	19.6	31.1	<b>50.7</b>	27.3	16.5	<b>43.9</b>	<b>6.9</b>	16%	42%	65%	<b>54%</b>
North America/Oceania	23.1	28.9	<b>52.0</b>	29.2	16.9	<b>46.1</b>	<b>5.9</b>	13%	44%	63%	<b>53%</b>
Latin America	19.7	38.2	<b>57.9</b>	35.5	12.8	<b>48.3</b>	<b>9.6</b>	20%	36%	75%	<b>55%</b>
Middle East/North Africa	9.2	42.9	<b>52.1</b>	32.0	7.0	<b>39.0</b>	<b>13.0</b>	33%	22%	86%	<b>57%</b>
East Asia	25.2	30.3	<b>55.5</b>	35.5	7.5	<b>43.1</b>	<b>12.4</b>	29%	41%	80%	<b>56%</b>
Russia/Central Asia	20.8	31.9	<b>52.7</b>	28.9	11.5	<b>40.4</b>	<b>12.3</b>	30%	42%	74%	<b>57%</b>
Subsaharan Africa	23.8	25.9	<b>49.6</b>	33.3	6.3	<b>39.7</b>	<b>9.9</b>	25%	42%	80%	<b>56%</b>
South & Sout-East Asia	24.0	38.8	<b>62.8</b>	40.4	9.3	<b>49.7</b>	<b>13.1</b>	26%	37%	81%	<b>56%</b>
Europe 1960-1980	14.0	45.9	<b>59.9</b>	33.3	12.9	<b>46.3</b>	<b>13.7</b>	30%	30%	78%	<b>56%</b>
Europe 1980-2000	16.0	35.1	<b>51.1</b>	29.6	14.4	<b>44.0</b>	<b>7.2</b>	16%	35%	71%	<b>54%</b>
Europe 2000-2025	19.6	31.1	<b>50.7</b>	27.3	16.5	<b>43.9</b>	<b>6.9</b>	16%	42%	65%	<b>54%</b>
NAOC 1960-1980	16.5	38.9	<b>55.4</b>	35.4	14.2	<b>49.6</b>	<b>5.8</b>	12%	32%	73%	<b>53%</b>
NAOC 1980-2000	22.3	29.5	<b>51.8</b>	33.5	15.8	<b>49.3</b>	<b>2.5</b>	5%	40%	65%	<b>51%</b>
NAOC 2000-2025	23.1	28.9	<b>52.0</b>	29.2	16.9	<b>46.1</b>	<b>5.9</b>	13%	44%	63%	<b>53%</b>

**Interpretation.** If we look at total labour time (economic + domestic), women work more men in all categories of countries, particularly in low-income countries (per capita NNI<10k€ PPP 2023) & middle-income countries (btw 10k & 30k). **Note.** Economic labour includes labour used to produce goods & services included in national accounts. Domestic labour includes all other forms of labour: household cleaning, cooking, child-care, etc. Authors' computations using time-use surveys run in 35 countries over 2000-2025 period. **Sources & series:** wid.world

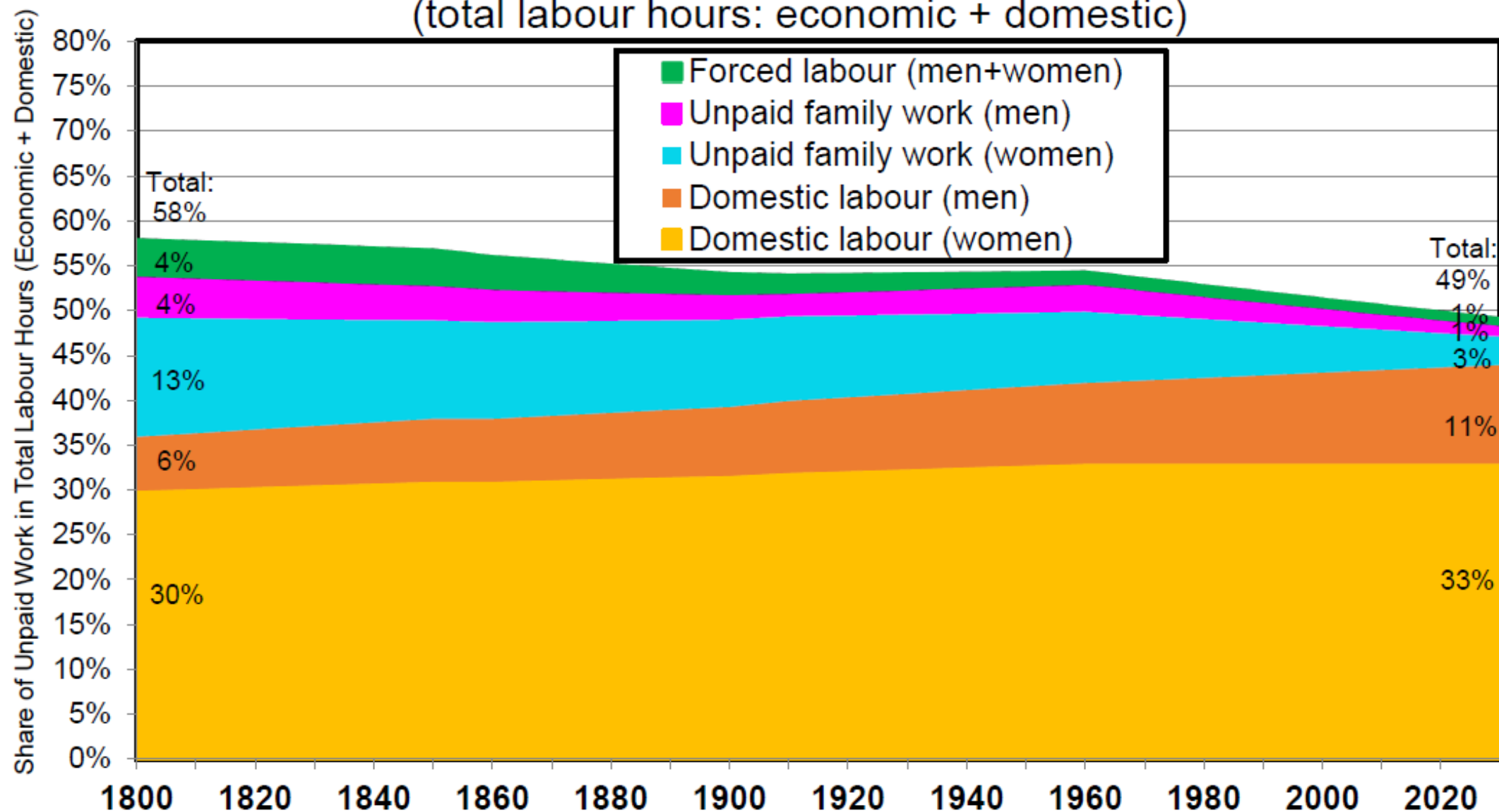
**Fig. 17. Unpaid Work: A Global Assessment 1800-2025**  
(economic labour hours)



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

**Fig. 18. Unpaid Work: A Global Assessment 1800-2025**

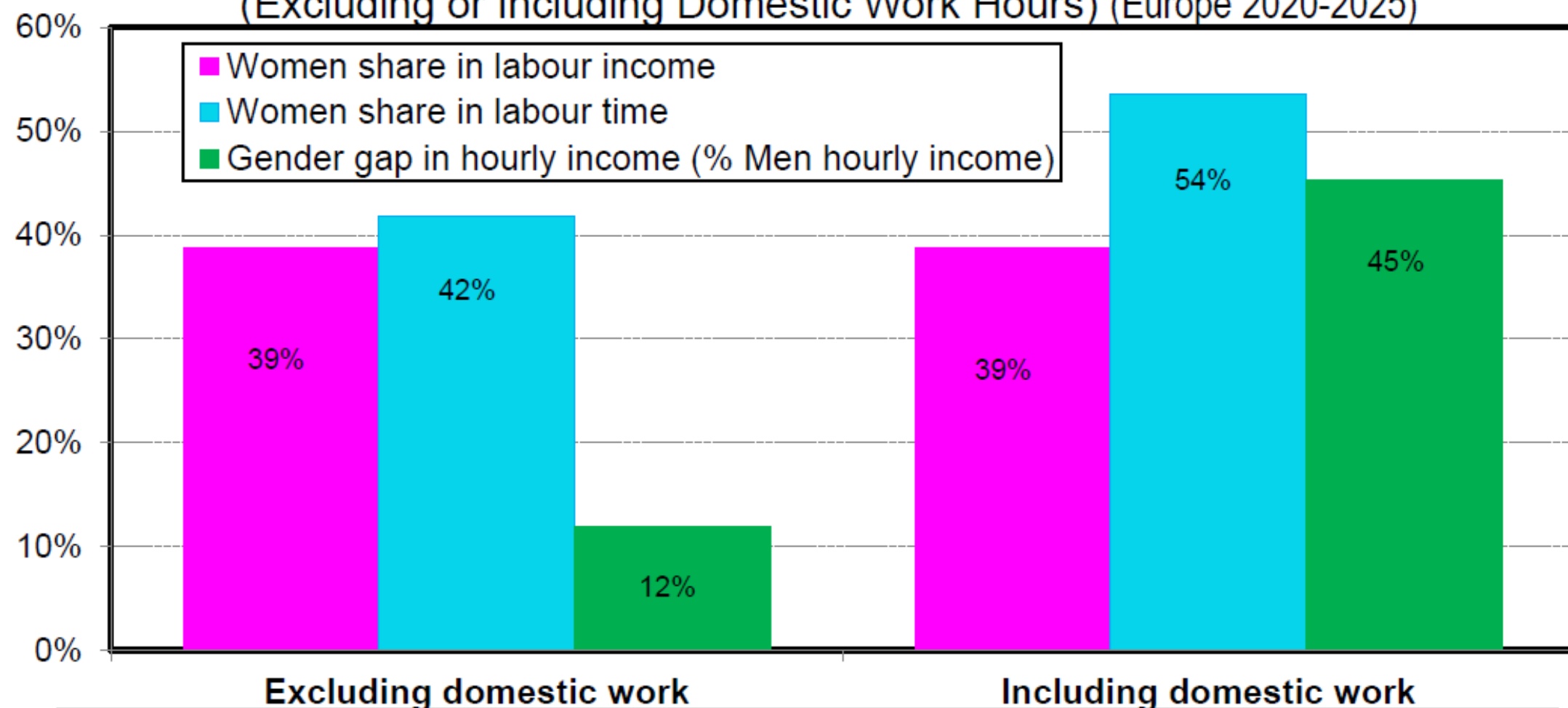
(total labour hours: economic + domestic)



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

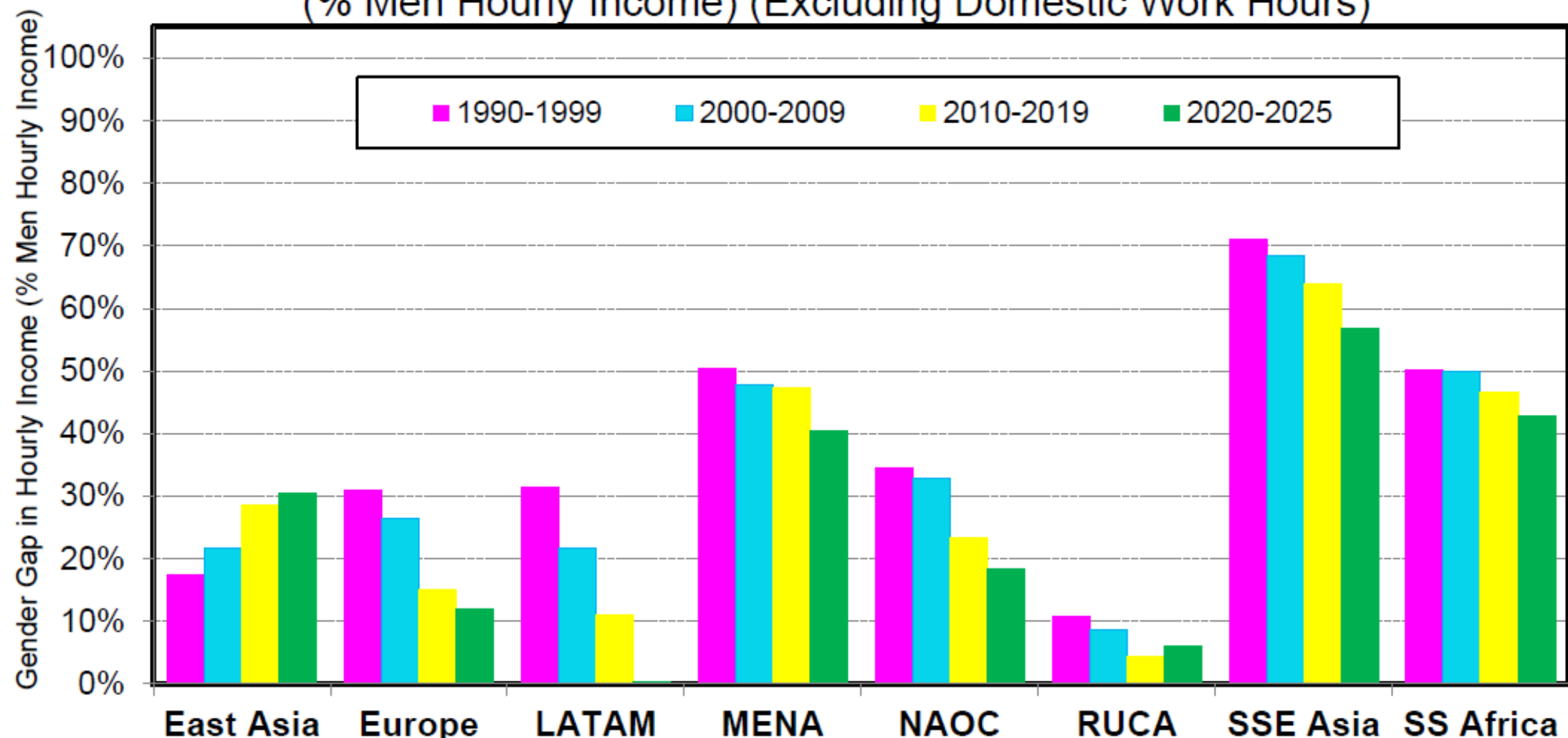


**Fig. 19. Alternative Measures of the Gender Gap**  
(Excluding or Including Domestic Work Hours) (Europe 2020-2025)



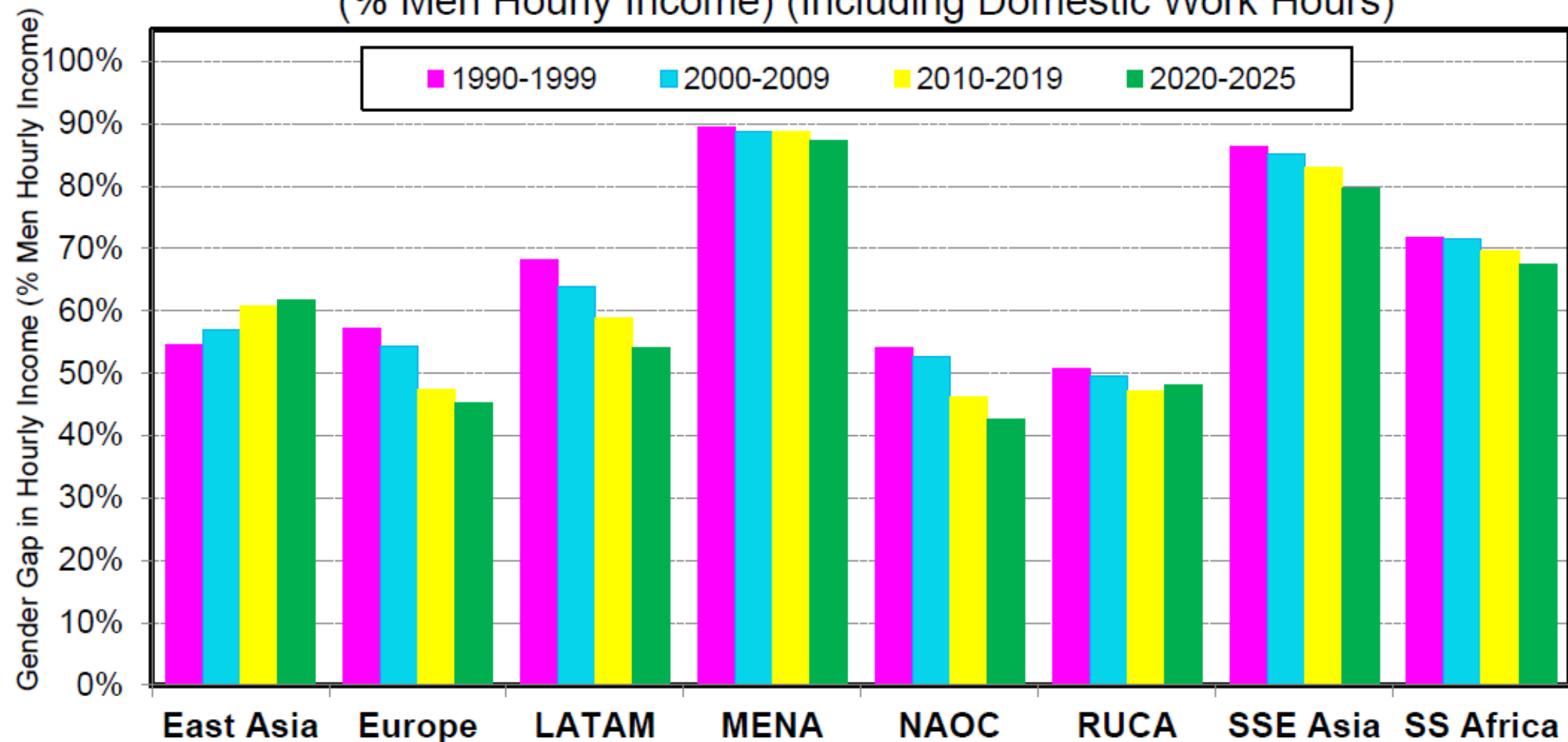
**Interpretation.** The share of women in total labour income is equal to 39% in Europe in 2020-2025, while their share in economic work hours is equal to 42%. This implies that their average income per work hour (excluding domestic work hours) is 12% smaller than that of men. However their share in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

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



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

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

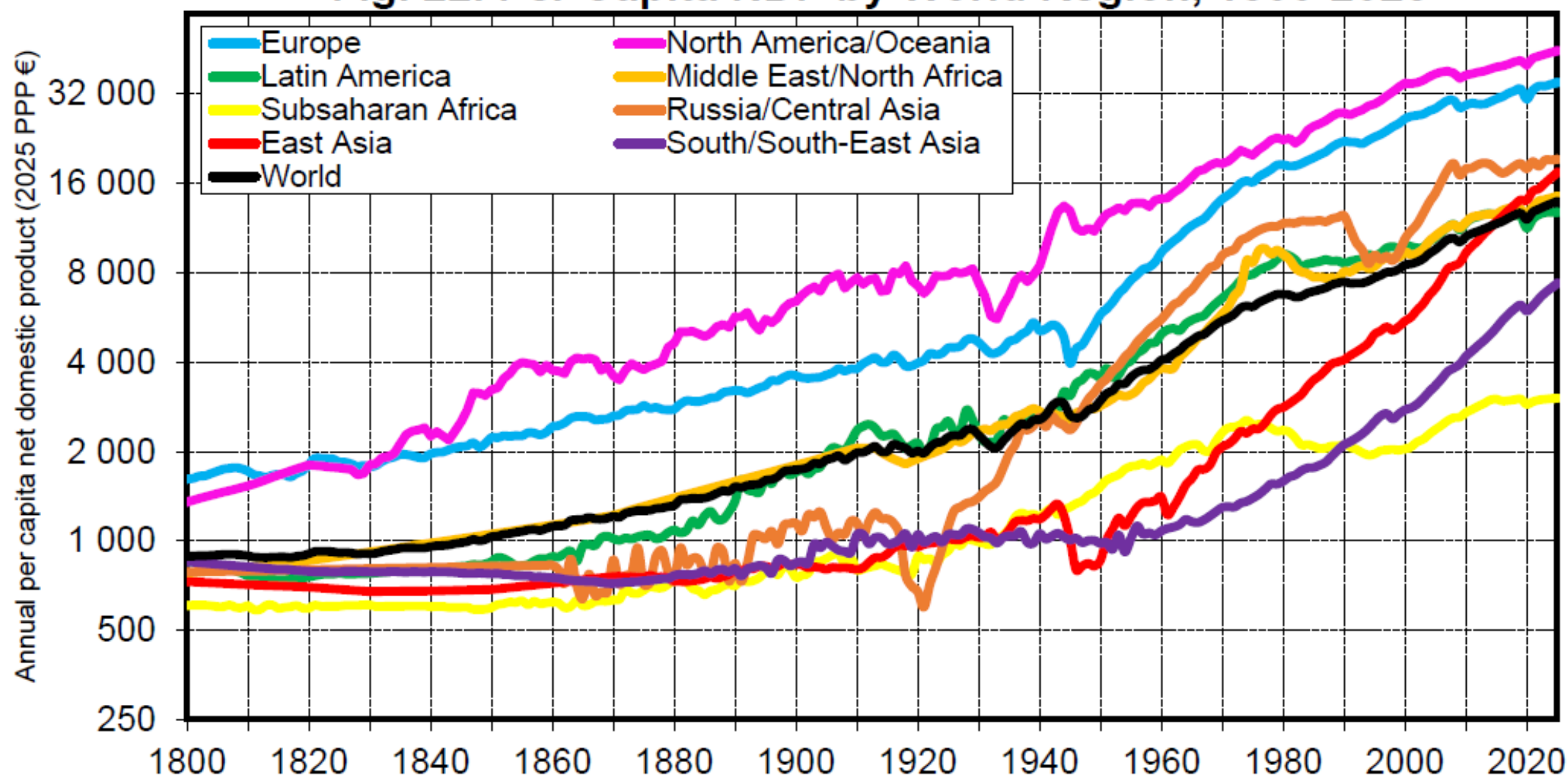


**Interpretation.** Average women labour income per work hour (including both economic and domestic work hours) was 57% smaller than average men labour income per work hour in Europe in 1990-1999, and it is 45% smaller in 2020-2025. The bottom line is that when we include domestic work then the gender gap looks very large in all world regions: generally around 40-50% in the most gender-equal regions and up to 80-90% in the most gender-unequal regions. **Sources & series:** wid.world

(2) We estimate a **large negative long-run elasticity between labour hours and productivity** (income effects > substitution effects), but with substantial variations across countries & periods

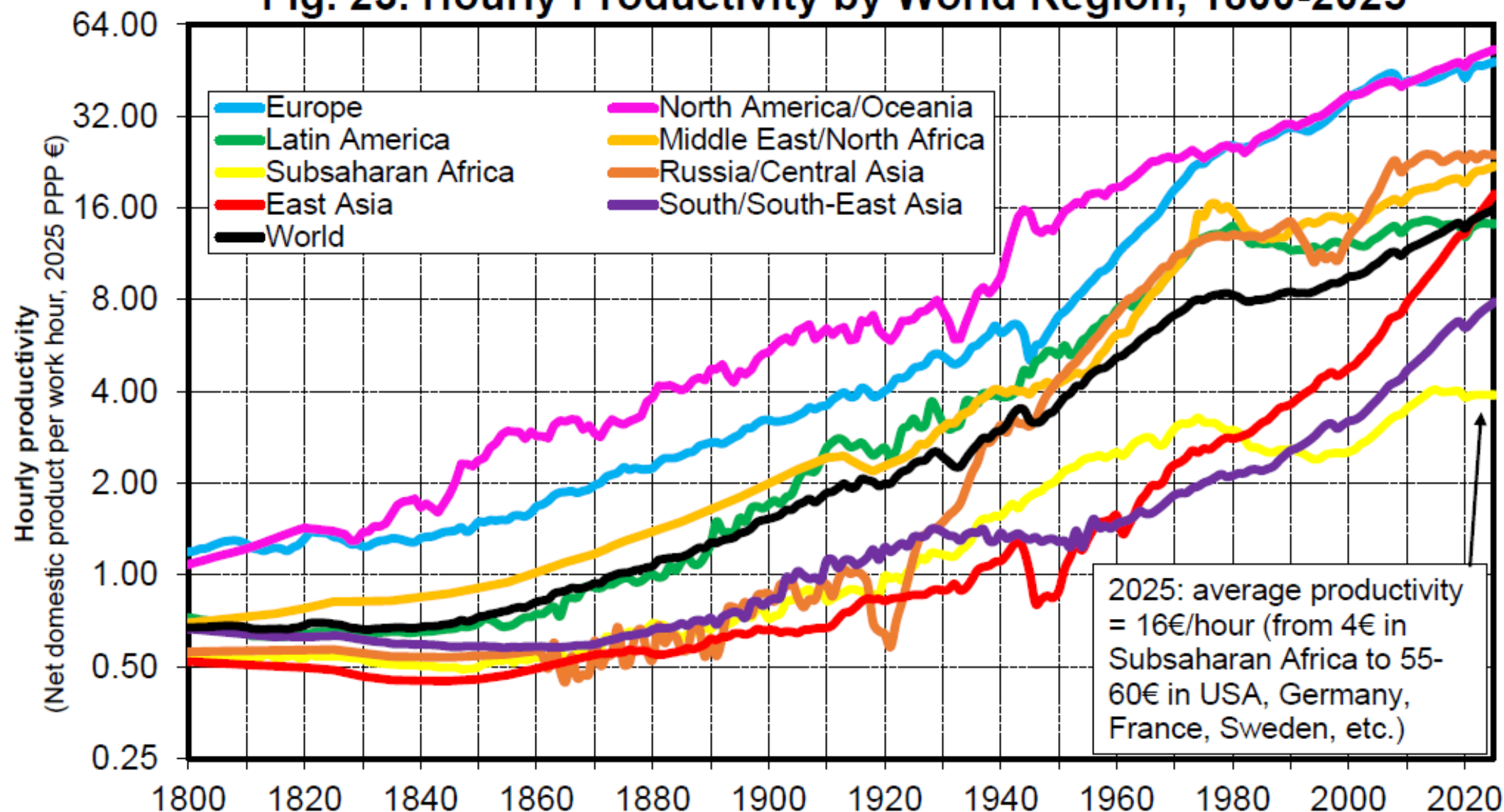


**Fig. 22. Per Capita NDP by World Region, 1800-2025**



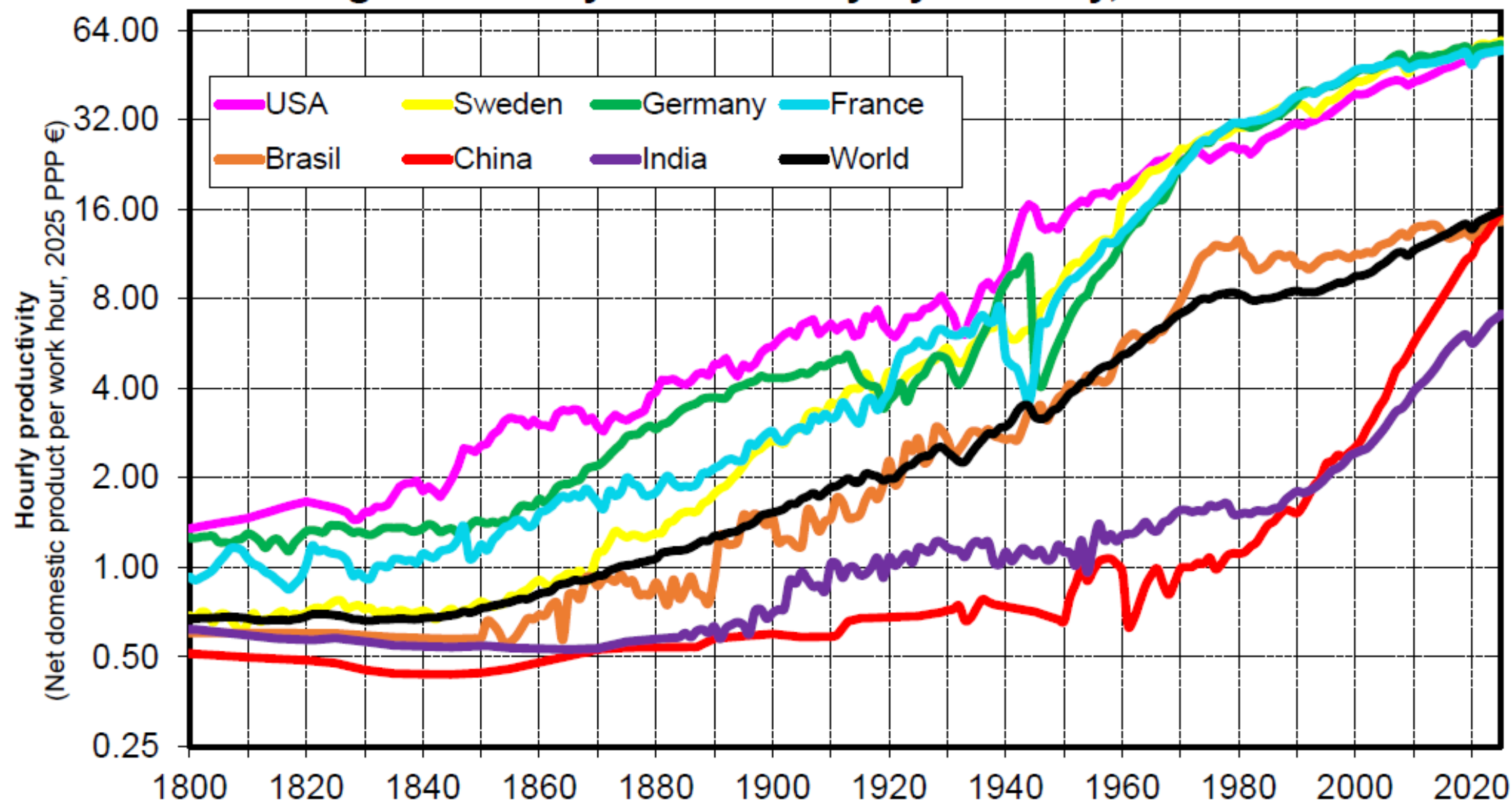
**Interpretation.** Expressed in 2025 PPP €, annual per capita net domestic product (NDP) rose from about 900€ in 1800 to 14 000€ in 2025 at the global level. I.e. it was multiplied by about 16, which corresponds to average annual real growth rate of 1,2% per year, with large variations over time and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

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



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

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



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

**Table 4. Productivity Growth by World Regions (1800-2025)**

Annual real growth rate of productivity (hourly NDP)	1800-2025	1800-1910	1910-1950	1950-1990	1990-2025
East Asia	1.6%	0.2%	0.7%	3.6%	<b>4.6%</b>
Europe	1.7%	1.0%	1.7%	3.6%	<b>1.4%</b>
Latin America	1.3%	1.2%	1.8%	2.0%	<b>0.6%</b>
Middle East/ North Africa	1.5%	1.1%	1.4%	2.9%	<b>1.4%</b>
North America/ Oceania	1.7%	1.6%	2.1%	1.8%	<b>1.6%</b>
Russia/ Central Asia	1.7%	0.5%	4.0%	3.0%	<b>1.5%</b>
South/South-East Asia	1.1%	0.5%	0.4%	1.7%	<b>3.2%</b>
Sub Saharan Africa	0.9%	0.4%	2.4%	0.5%	<b>1.2%</b>
<b>World</b>	<b>1.4%</b>	<b>0.9%</b>	<b>1.7%</b>	<b>2.2%</b>	<b>1.8%</b>

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



**Table 5. The Elasticity of Labor Hours With Respect to Productivity**

	Average Annual Labour Hours per Employed Individual (log)			Average Annual Labour Hours per Working-Age Individual (15-64) (log)		
Hourly Productivity (log) (s.e.)	-0.128*** (0.001)	-0.176*** (0.001)	-0.082*** (0.003)	-0.145*** (0.001)	-0.192*** (0.001)	-0.116*** (0.005)
Country Fixed Effects	NO	YES	YES	NO	YES	YES
Period Covered	1800-2025	1800-2025	1980-2025	1800-2025	1800-2025	1980-2025
R2	0.59	0.80	0.76	0.55	0.75	0.73
N.obs	12882	12882	2622	12882	12882	2622

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

Baseline historical elasticity  $\approx -0,15$  (between  $-0,12$  &  $-0,18$ )

I.e. when productivity  $\uparrow$  by 1%, labour hours  $\downarrow$  by 0,15%

Quite substantial: if productivity is multiplied by 30 ( $\approx 1800-2025$ ), then labor hours decline by about 40% ( $30^{-0.15} = 0,60$ )

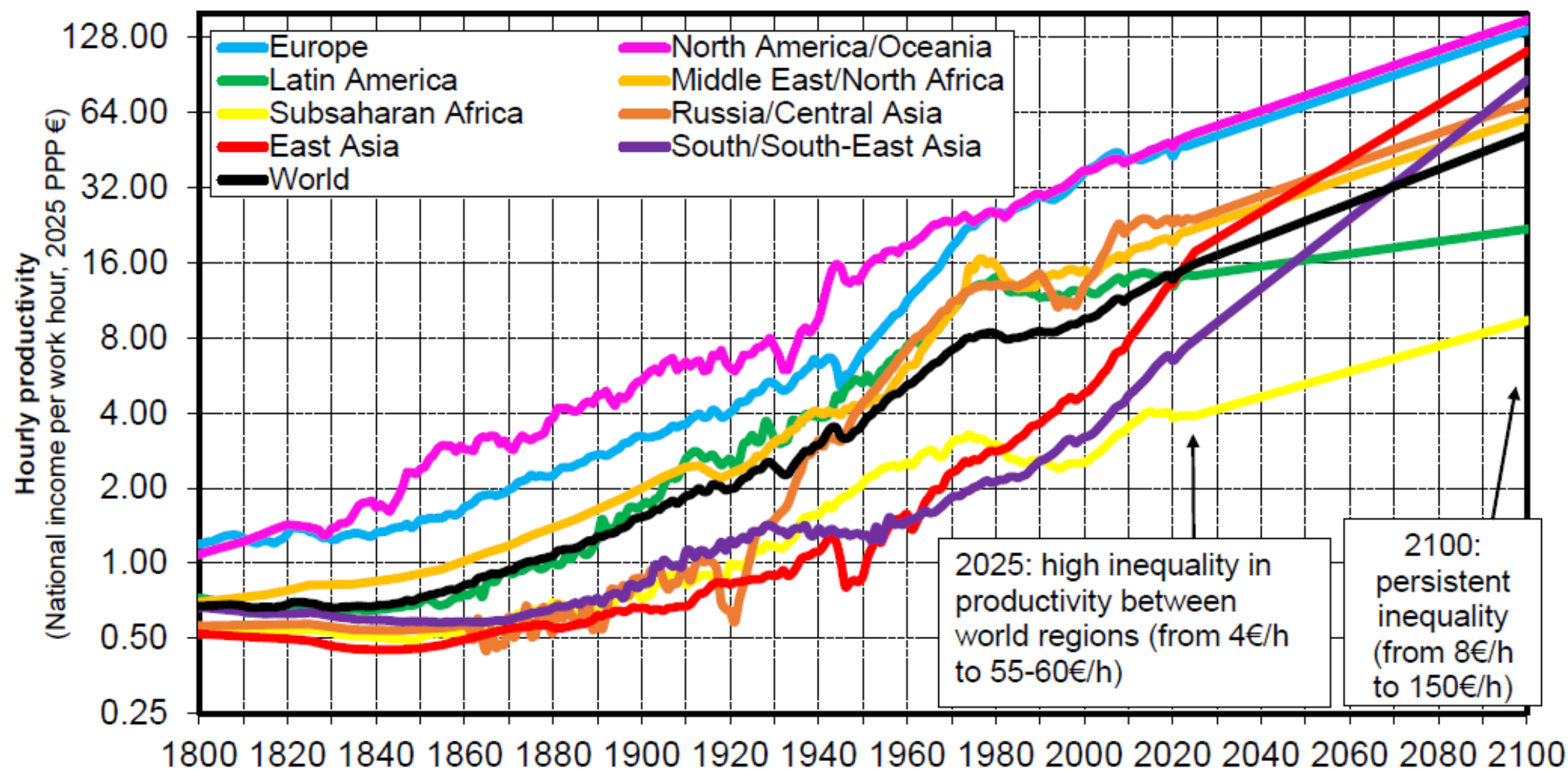
I.e. about 40% of the 30-fold rise in productivity was used to reduce labour hours and obtain extra leisure (rather than extra consumption), so that per capita NDP was multiplied by 19 (rather than 30)  $\rightarrow$  **40%-60% historical split between leisure & production**

(3) We discuss several possible trajectories for labor hours, productivity, gender inequality and structural transformation over 2025-2100 period

**Business-as-usual scenario:** continuation of 1990-2025 regional trends in productivity → **widening North-South inequality**, with only 7€ hourly productivity in Subsaharan Africa 2100 (vs 4€ 2025), and population 3.3b (vs 1.3b 2025)

→ **explosive socioeconomic path: enormous demographic pressures & rising political conflict about climate/post-colonial reparations**

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



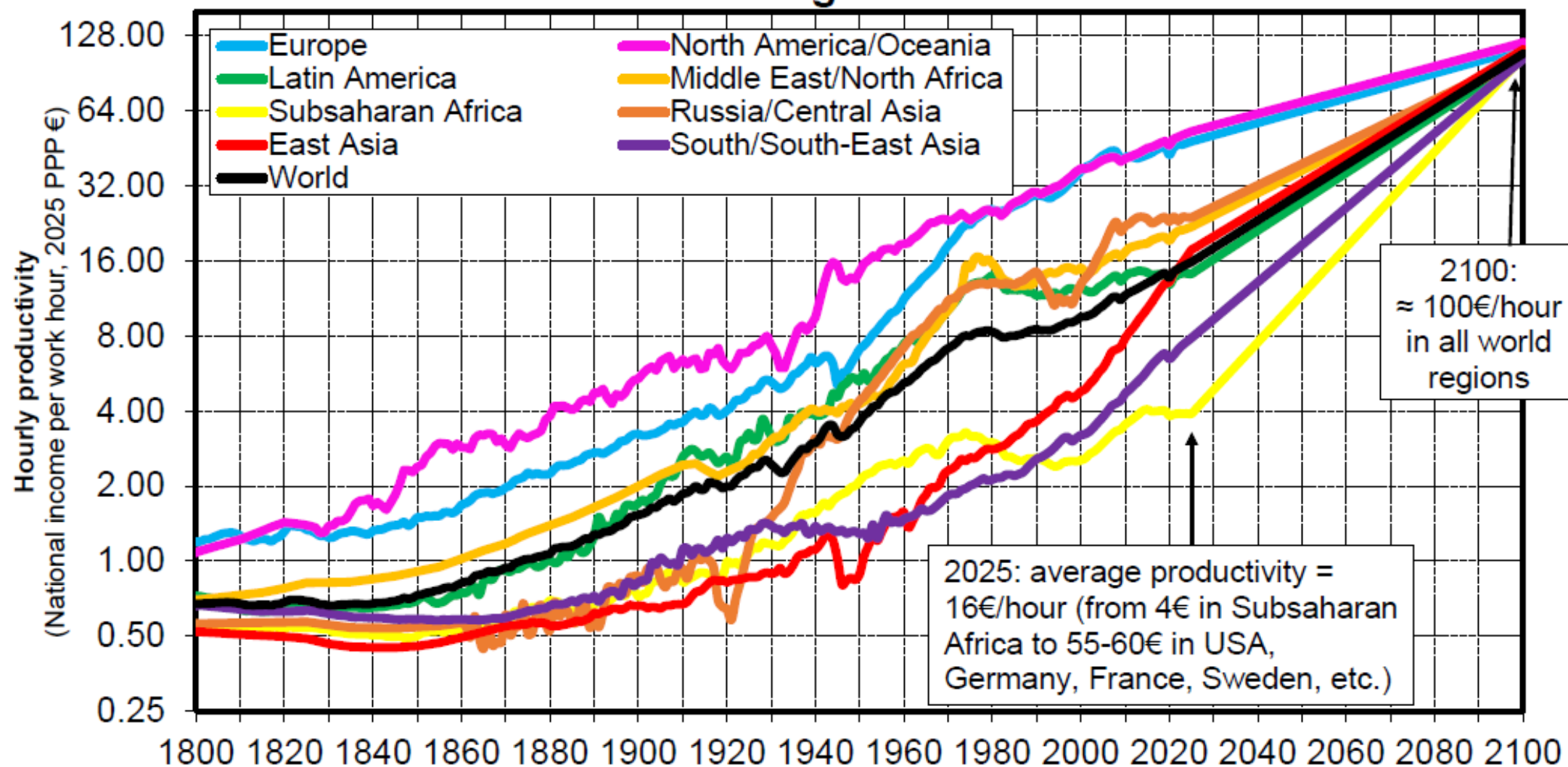
**Interpretation.** Under the "business-as-usual" scenario (same productivity growth rates as in 1900-2025, with minor changes), inequality in hourly productivity is projected to remain very high between world regions by 2100. In particular, productivity in 2100 would be only 9€/hour in Subsaharan Africa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



**Global convergence scenario: massive investment in energy, transport, education & health in global South (especially Sub-Saharan Africa & South/South-East Asia) so that all countries converge to about 100€ in hourly productivity by 2100**

**Global convergence scenario also includes complete gender equality, i.e. full convergence between women and men's employment rates, economic labor & domestic labor time by 2100**

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



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

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

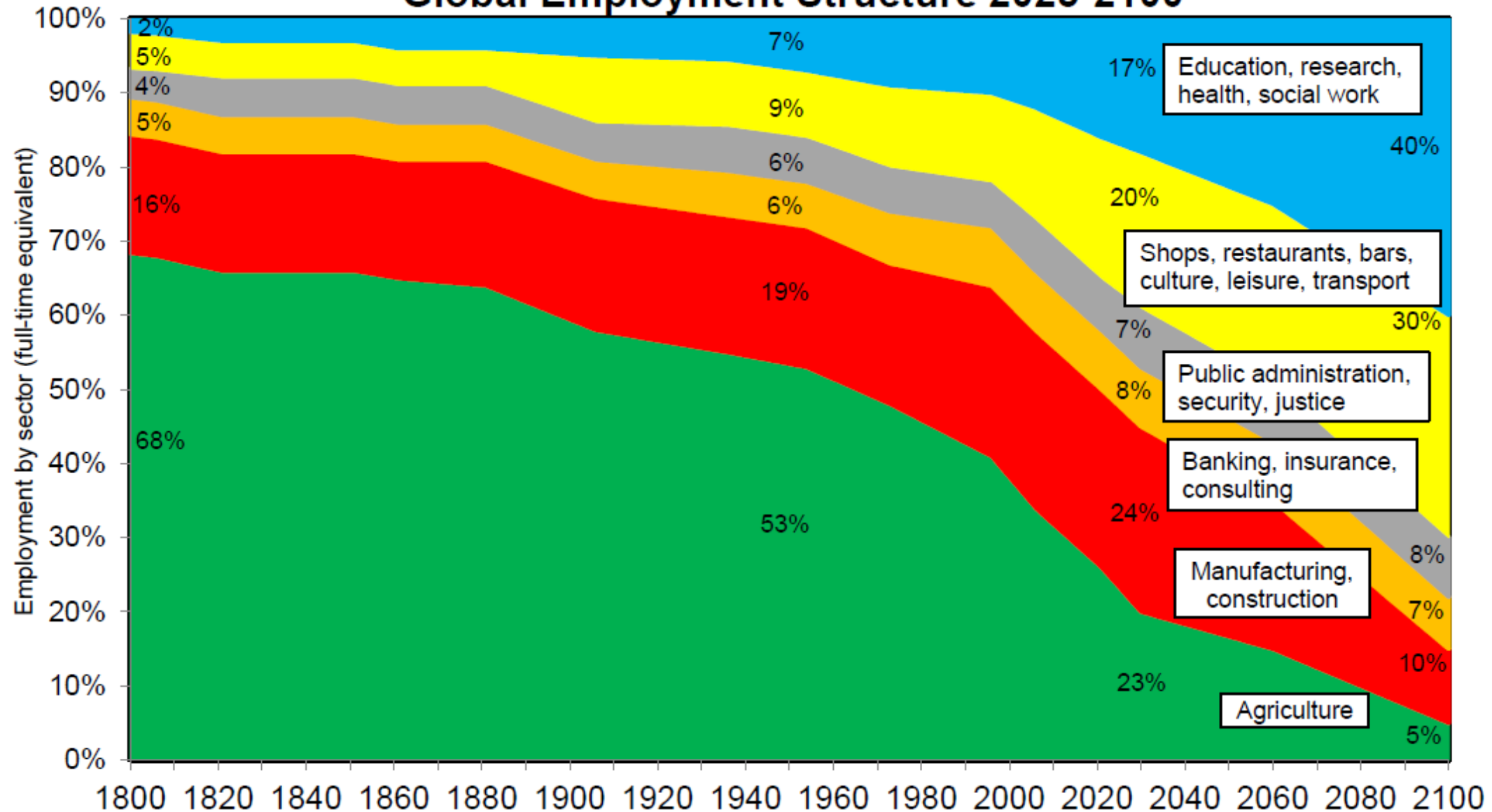
	Productivity 2025 (hourly NDP) (PPP € 2025)	Business-as-Usual Scenario		Global Convergence Scenario	
		Productivity growth rate 2025-2100	Productivity 2100 (PPP € 2025)	Productivity growth rate 2025-2100	Productivity 2100 (PPP € 2025)
East Asia	17.7	2.5%	112.8	2.5%	112.8
Europe	48.2	1.4%	136.8	1.2%	113.7
Latin America	14.2	0.6%	21.8	2.7%	104.7
Middle East/ North Africa	21.9	1.4%	60.7	2.1%	104.1
North America/ Oceania	52.9	1.4%	150.1	1.1%	120.2
Russia/ Central Asia	23.9	1.5%	70.4	2.0%	105.5
South/South-East Asia	7.8	3.2%	86.2	3.5%	103.6
Sub Saharan Africa	3.9	1.2%	9.4	4.5%	105.7
World	15.8	1.6%	52.1	2.6%	108.5

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

**Is 100€ in hourly productivity for all by 2100 viable?**  
I.e. is this compatible with ecological constraints and planetary habitability?

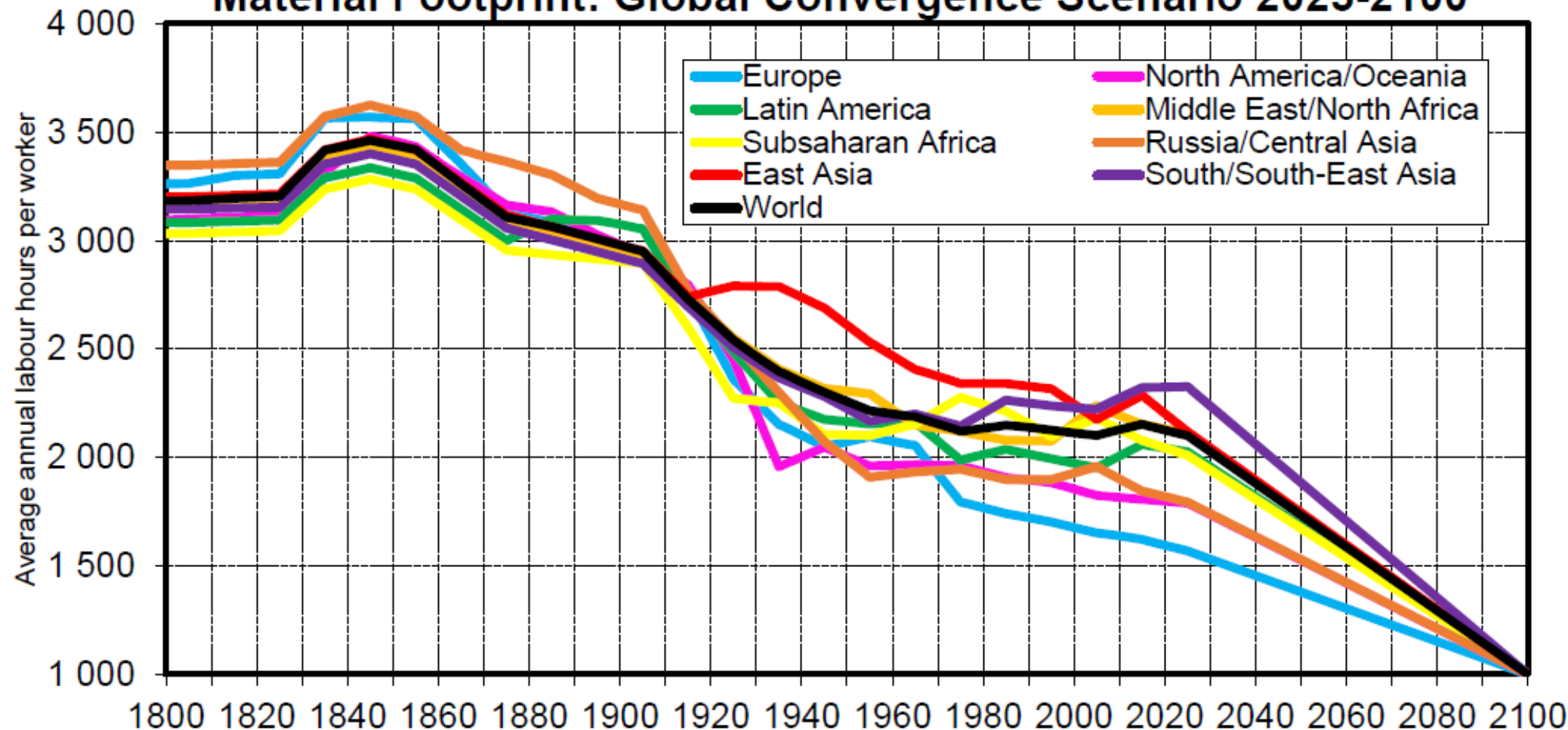
**Potentially yes, but only if (i) Large sectoral reallocation of labour time away from the most polluting sectors:** sectoral shift (rise of education, health etc. decline in manufacturing, transport, construction, etc.) + large decarbonation in all sectors (incl. education, health etc.)  
**(ii) Large reduction in work hours** (comparable in size to what happened over 1860-1980 period)

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



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

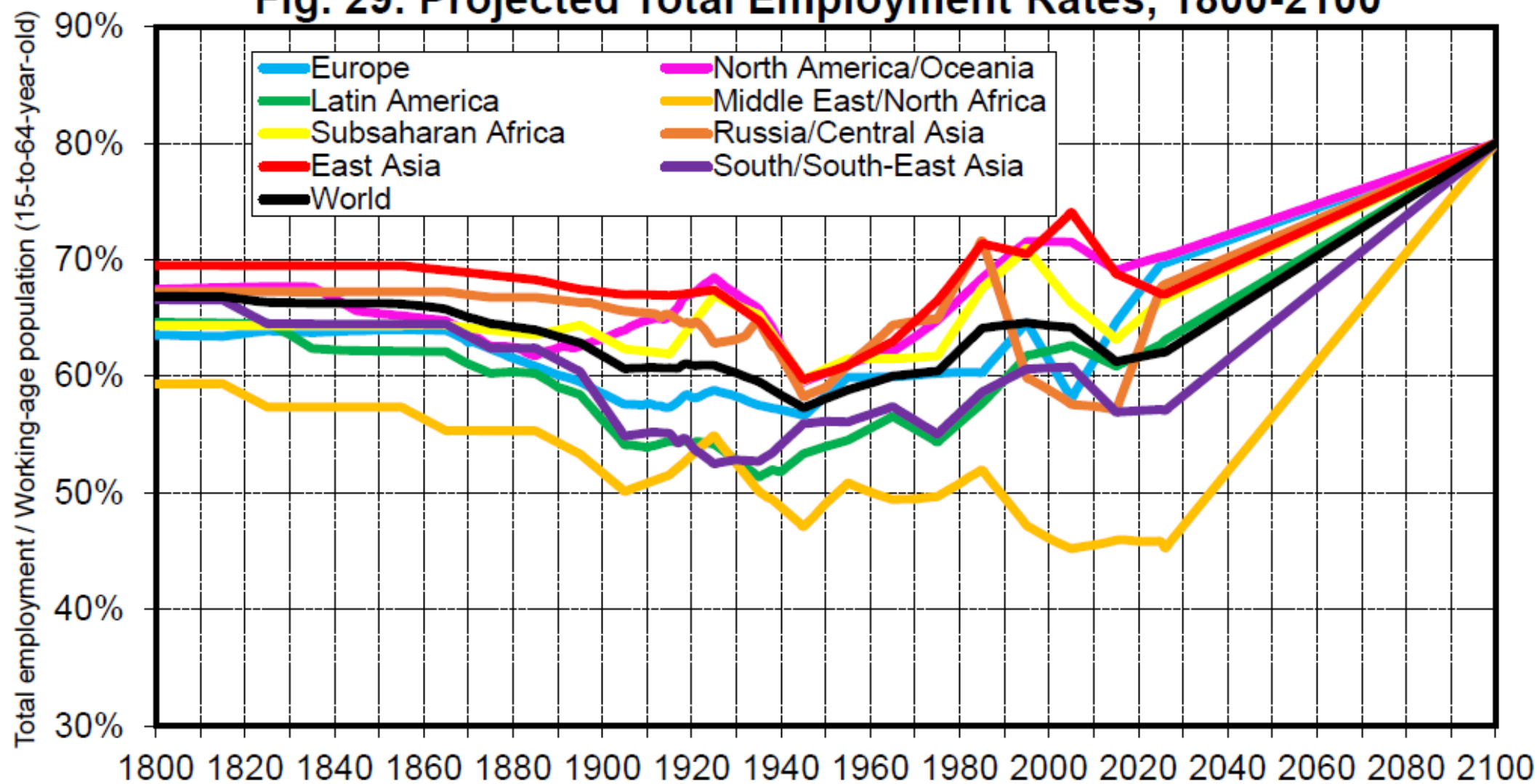
**Fig. 28. Using Productivity Gains to Reduce Work Hours & Material Footprint: Global Convergence Scenario 2025-2100**



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



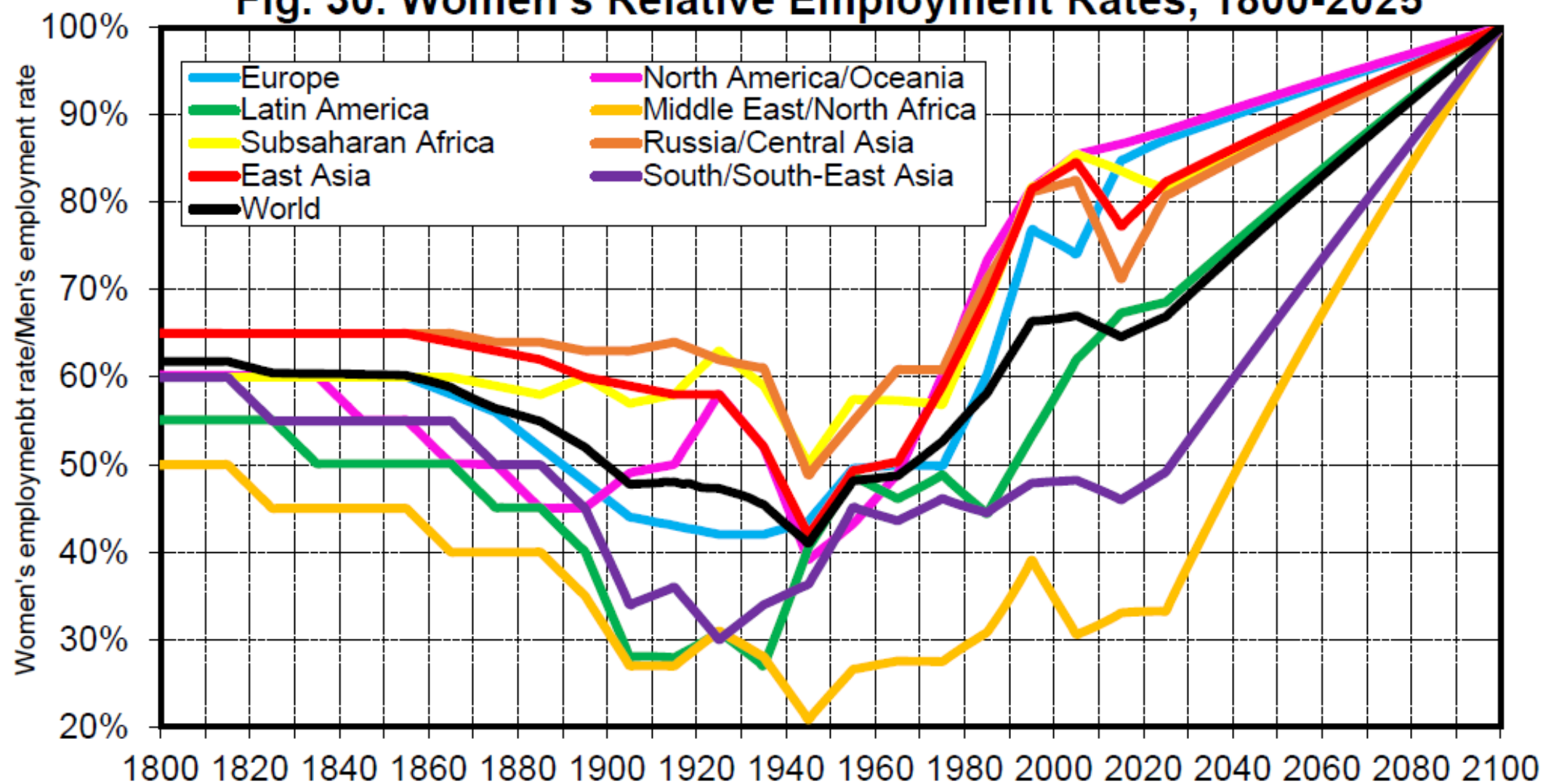
**Fig. 29. Projected Total Employment Rates, 1800-2100**



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

**Sources and series:** see wid.world

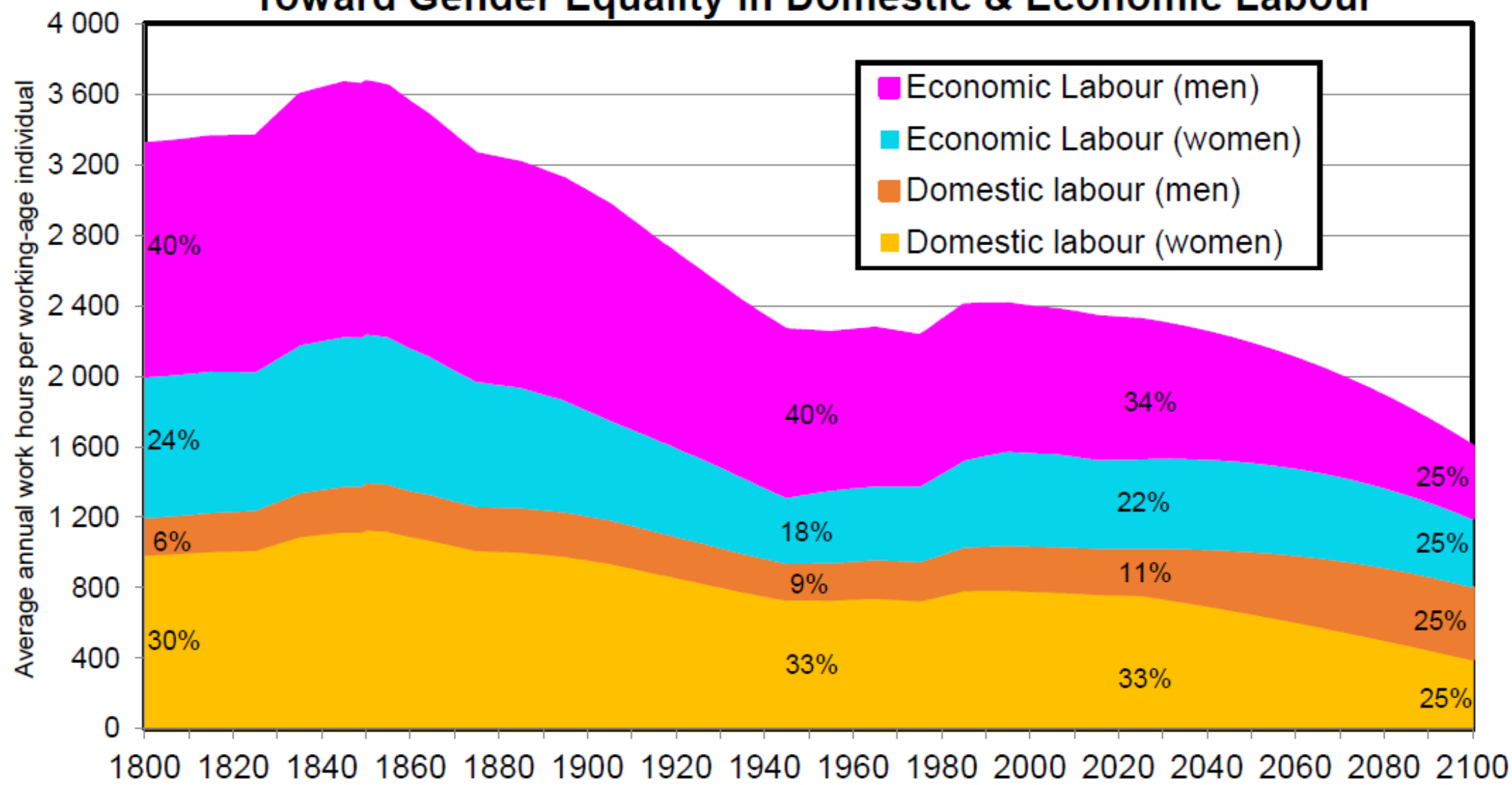
**Fig. 30. Women's Relative Employment Rates, 1800-2025**



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

**Sources and series:** see wid.world

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



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

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

Global Convergence Scenario: 1000h worktime in 2100 (25h x 40w)

	Productivity 2025 (hourly NDP) (PPP € 2025)	Living Standards 2025 (per capita NDP) (PPP € 2025)	Productivity 2100 (hourly NDP) (PPP € 2025)	Living Standards 2100 (per capita NDP) (PPP € 2025)	Share of Productivity Gains Devoted to Extra Leisure (vs Extra Production)
East Asia	17.7	17 423	112.8	54 138	51%
Europe	48.2	35 031	113.7	54 568	34%
Latin America	14.2	12 793	104.7	50 273	47%
Middle East/ North Africa	21.9	14 511	104.1	49 984	28%
North America/ Oceania	52.9	44 755	120.2	57 690	43%
Russia/ Central Asia	23.9	19 276	105.5	50 643	41%
South/South-East Asia	7.8	7 373	103.6	49 713	49%
Sub Saharan Africa	3.9	3 024	105.7	50 757	38%
<b>World</b>	<b>15.8</b>	<b>13 931</b>	<b>108.5</b>	<b>52 088</b>	<b>45%</b>

**Interpretation.** According to the "global convergence" scenario, 45% of productivity gains will be devoted to extra leisure (as opposed to extra production) at the global level over the 2025-2100 period.

**Note.** Computations are made under the assumption that employment rate converges to 80% for working-age men and women in 2100 and that fraction of working-age population in total population is equal to 60% in 2100. **Sources and series:** wid.world



**Table 8. Using Productivity Gains to Reduce Work Time & Material Footprint**

Less Ambitious Scenario: 1260h worktime 2100 (30h x 42w)

	Productivity 2025 (hourly NDP) (PPP € 2025)	Living Standards 2025 (per capita NDP) (PPP € 2025)	Productivity 2100 (hourly NDP) (PPP € 2025)	Living Standards 2025 (per capita NDP) (PPP € 2025)	Share of Productivity Gains Devoted to Extra Leisure (vs Extra Production)
East Asia	17.7	17 423	112.8	68 214	39%
Europe	48.2	35 031	113.7	68 756	17%
Latin America	14.2	12 793	104.7	63 344	33%
Middle East/ North Africa	21.9	14 511	104.1	62 980	9%
North America/ Oceania	52.9	44 755	120.2	72 689	29%
Russia/ Central Asia	23.9	19 276	105.5	63 810	25%
South/South-East Asia	7.8	7 373	103.6	62 639	36%
Sub Saharan Africa	3.9	3 024	105.7	63 954	22%
<b>World</b>	<b>15.8</b>	<b>13 931</b>	<b>108.5</b>	<b>65 631</b>	<b>31%</b>

**Interpretation.** According to the less ambitious scenario, 31% of productivity gains will be devoted to extra leisure (as opposed to extra production) at the global level over the 2025-2100 period.

**Note.** Computations are made under the assumption that employment rate converges to 80% for working-age men and women in 2100 and that fraction of working-age population in total population is equal to 60% in 2100. **Sources and series:** wid.world

**Table 9. Using Productivity Gains to Reduce Work Time:  
Lessons from the Past and Scenarios for the Future**

	<b>Share of Productivity Gains Devoted to Extra Leisure (vs Extra Production)</b>
<b>1800-2025</b>	<b>33%</b>
incl. 1800-1860	-4%
incl. 1860-1980	41%
incl. 1980-2025	-8%
<b>Global Convergence Scenario 2025-2100</b> (Target 2100: 1000h = 25h/w x 40w)	<b>45%</b>
<b>Less Ambitious Scenario 2025-2100</b> (Target 2100: 1260h = 30h/w x 42w)	<b>31%</b>

**Interpretation.** According to the "global convergence" scenario, 45% of productivity gains will be devoted to extra leisure (as opposed to extra production) at the global level over the 2025-2100 period. This is roughly in line with the historical record observed during the 1860-1980 period (slightly more ambitious). **Sources and series:** wid.world



# Conclusion

**Large reduction in work hours in the past (-40%), slow rise of gender equality** → this is the path that needs to be followed in the future in order to confront ecological & social challenges

Enormous collective mobilization was necessary to deliver work time reduction in the past, & it will likely be the same in the future

**Future research should focus on the study of material, socioeconomic & political feasibility of global convergence scenario**