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Claudia Goldin and the economics of women and work

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Claudia Goldin won the 2023 Nobel Memorial Prize in Economic Sciences "for having advanced our understanding of women's labor market outcomes." Wielding her expertise in economic history and labor economics, she produced the first comprehensive account of the evolution of women's labor supply and earnings in a span of 200 years. While recognizing the role of discrimination, Goldin is known for exploring alternative drivers of the gender gap by using the lens of education, fertility, parenthood, social norms, institutional change, and women's aspirations and identity. Her body of work was key for the study of women's labor market outcomes—a subject that had been largely overlooked—to enter mainstream economics. This paper highlights Goldin's major contributions to economics as a field and influence on policy research.

JEL classification: J16, N3
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1. Introduction

> "My question was, I know where women are today and I know where they once were, how did they get to today? That's sort of why women won. That does not mean that women have won exactly what they should win, or that along the way all women won what they should have gotten. But it is a statement that where we are today is very, very different where we were in my own lifetime, not when I was born, not even when I was in college, but when I was in graduate school, and even when I was an assistant professor at Princeton."—Claudia Goldin on why she chose the title "Why women won" for her 2023 paper ["Transcript" 2023][1]

Women are underrepresented in the labor market. Though women are increasingly entering the labor force, there remains a large gender gap in the global

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[1] This is from the transcript of the Nobel Prize interview with Claudia Goldin. https://www.nobelprize.org/prizes/economic-sciences/2023/goldin/217472-interview-transcript/ (Accessed 6 April 2024).

labor force participation rate: 52.2 percent for women versus 79.8 percent for men.[2] In addition, when women are employed, they tend to earn less than men. Global estimates indicate that women are paid approximately 20 percent less than men [ILO 2018a]. Knowing the presence of gender gaps is one matter; understanding why these persist and are still prevalent is another. If women are undervalued in the labor market relative to men, it becomes both an equity and efficiency issue [Committee for the Prize in Economic Sciences in Memory of Alfred Nobel 2023]. The gender pay gap, for instance, is deemed a manifestation of social injustice [ILO 2018b]. Despite the increase in women's labor force participation rates, they are more likely to be employed as unpaid family workers or be in part-time employment. The lower access of women to good employment opportunities, even if they are equally skilled as their male counterparts, means that women's potential contribution to economic output is not being fully realized. These create inefficiencies, leading to lower aggregate productivity and income. Thus, addressing the gender gap could likely result in higher global GDP analogous to the impact of globalization on economic growth [Krugman 2023].

Recognizing the relevance of studying female labor market outcomes, however, was far from conventional and arguably disregarded up until nearly half a century ago. The early models in mainstream economics focused on representative agents, and the heterogeneity in economic agents was only introduced in the context of socioeconomic status and economic outcomes [Goldberg 2023]. This changed when Claudia Goldin's influential research on women's work in the 1980s—and continuing in current times—paved way for the field to enter mainstream economics.

An economic historian and labor economist, Claudia Goldin won the 2023 Nobel Memorial Prize in Economic Sciences "for having advanced our understanding of women's labor market outcomes." Goldin developed a unifying framework—something that was lacking prior to her work—that explains the gender differentials in labor force participation, employment, and earnings using the lens of education, fertility, parenthood, social norms, institutional change, and women's aspirations and identity [Committee for the Prize in Economic Sciences in Memory of Alfred Nobel 2023]. Identifying as an economics detective, she combined her expertise in economic history and labor economics to provide the first comprehensive account of women's labor force participation and earnings and how these have changed over time by digging records of more than 200 years' worth of US history. Goldin is often described as the trailblazer in the economics of women and is credited for providing the backbone of the advances in research agendas on gender [Petrongolo 2024]. Wright [1991] seems to have foreseen this in his review of Goldin's 1990 book, *Understanding the gender gap: an economic history of American women*,[3] where he concluded that this work was

[2] International Labor Organization (ILO) modelled estimates in November 2023 for people aged 25 years and above.

[3] This is the second book written by Goldin, and it won two awards in 1990: the Allan Sharlin Book Award and the Richard A. Lester Prize.

just the beginning in which the economic history of women will not be merely regarded as "a narrow subspecialty largely isolated from the major themes and developments of the economy as a whole."

As her analysis puts women in the center, Goldin's win is both groundbreaking and symbolic. Out of the 93 Nobel Laureates in Economic Sciences, she is only the third woman to win the Prize and the first to win it solo. This is, however, not the first time she broke glass ceilings. In 1990, she became the first woman to be granted tenure at Harvard University's Department of Economics. Her pursuit to understand women's labor market outcomes has thus not only reshaped labor economics and economics in general but is also considered to be a model for women to prosper in a field that is historically dominated by men [Perrin 2024].

This paper seeks to highlight Goldin's key contributions to labor economics and gender studies. Section 2 summarizes Goldin's research that was central to her Nobel Prize win. Section 3 discusses the influence and policy implications of Goldin's work. Section 4 concludes the paper.

2. Goldin's Nobel-winning research

The Committee for the Prize in Economic Sciences in Memory of Alfred Nobel [2023] attributed Goldin's Nobel Prize win to her account of the economic history of women and determining the remaining barriers for women in contemporary times. Before Goldin's research, producing meaningful estimates of women's work tended to be dismissed, because documenting the long-run changes in the gender disparities in the labor market had been believed to be impossible given the lack of historical data and, if available, their unreliability [Committee for the Prize in Economic Sciences in Memory of Alfred Nobel 2023]. It has been then crucial to Goldin's research, especially the seminal ones, to dig novel sources of data, and to identify and remedy the systematic errors in these data. With a much longer time-series data at hand, Goldin managed to uncover the evolution in the driving forces of the gender gap and women's work in the US from the 1790s to modern times.

2.1. U-shaped female labor supply function

Prior to Goldin's work, the common empirical finding was that the female labor force participation rate increases with economic development, but this emanated from the absence of accurate and reliable census data before 1940 [Committee for the Prize in Economic Sciences in Memory of Alfred Nobel 2023]. Goldin [1986,1990] and Goldin and Sokoloff [1982] dug new quantitative and qualitative information such as those from Labor Department surveys, a retrospective survey of working histories of women, office firm surveys, and directories, among others, to construct new data in documenting women's work in the US. Goldin's further empirical innovation in this regard was to probe for the factors to explain why

female work and earnings had been historically underestimated and then correct these biases and errors. One example of these errors was recording a married woman as "wife" in the censuses before 1940, despite working, say, in the family farm or business.[4] Changing definitions of labor force participation was another prevalent issue, among others.[5] As she traced back time-series data to as early as the 1790s, Goldin was able to establish that the female labor force participation rate in relation to economic development was in fact "U-shaped."[6] She showed that the increase in the female labor force participation rate during the 20th century as observed in previous studies was actually preceded by a decline in female participation in the 19th century. Goldin [1995] also demonstrated that the U-shaped pattern can be constructed in the international context using cross-country data.

Goldin's narrative behind the U-shaped pattern in the US is as compelling as the empirical work she has done (Goldin [1986,1988,1990,2024]; Goldin and Sokoloff [1982]). The participation of women in the labor market declined as the economy transitioned from an agrarian society to an industrial society. The proximity of farm work to households enabled women to combine home and market work during the agricultural period, but the movement of work out of the home during the Industrial Revolution constrained the occupational choices of women. There was also social stigma surrounding the employment of married women, especially in jobs associated with heavy, "dirty" work mostly found in manufacturing. This social stigma often stems from the belief of the community that a husband who allows his wife to work in an unsafe environment is indolent. On the other hand, the growth in the services sector led to increasing female labor force participation. The expansion of the services sector amid the rise of clerical and office work with better working conditions and higher returns to education encouraged more women to finish secondary education and participate in the labor market. Goldin noted, however, that the increase in the female labor supply associated with the expansion of the services sector was only clearly observed when "marriage bars",[7] which had legally prevented married women from being

[4] Before the censuses in 1940, Goldin [1990,2024] inferred that the nature of the question about one's occupation might have impelled responders, especially married women, to exclude economic activities even if these were valid occupations. In this regard, women might have been engaged in "hidden market work" as Goldin called it.

[5] Although expectedly less problematic, changing definition of labor force participation remains a concern in modern statistical data. In the Philippines, for example, official labor market statistics have been subject to several data breaks such as changing reference periods, labor force coverage, and unemployment definition in a span of almost 50 years. There is also the issue of differing definitions across countries which makes it more challenging to make cross-country comparisons. The ILO seeks to address this data issue by producing comparable estimates (called ILO modelled estimates) across countries.

[6] Goldin ([1995], as cited by Goldin [2024]) discussed the roots of the U-shaped relationship in the work of Boserup [1970] and Durand [1975].

[7] Goldin [1988] documented that "marriage bars" can take the form of either firing women once they got married or not hiring married women. The latter case was less restrictive, since single women who had been hired and eventually got married were allowed to retain their jobs. She estimated that, at the peak of this policy, 75 percent of school boards and 50 percent of office workers had been affected.

employed, were removed in the 1950s.[8] In other words, expanding employment opportunities for women is good, but unless barriers to seizing these opportunities are removed, female labor market participation would not improve.

Goldin pieced together the economic, social, and institutional factors across time in deciphering the changing economic participation of women. Nonetheless, as Goldin [1990] showed, the impact of these factors on female employment was mixed (e.g., married vs. single women, white vs. black women[9]), and the change in female labor supply could also be slow because of cohort effects. Statistically speaking, labor force participation rates are usually expressed on an average basis which does not reveal the variation in labor supply decisions between cohorts. The participation of cohorts in the labor market depends on the existing social norms and institutional barriers during their time, their own aspirations, investment in human capital, fertility decisions, and perception of labor market success based on the experiences of previous cohorts. In the US case, Goldin [1990] observed that in the 20th century each successive cohort exhibited a higher participation rate than the one before them, as women adjusted to new structures, obtained increasingly more accurate information on their employment prospects, and invested more in their education.

Goldin [1995] also proposed a framework of household and market production to explain the U-shaped female labor force participation over the course of economic development. The downward portion is associated with a strong income effect and a weak substitution effect. Because of the social stigma about female employment as work moves from the home to the market, female employment (especially among the married) is restricted, and female labor supply is more sensitive to family income and is less sensitive to their own wages. At higher stages of development, the upward portion manifests as the substitution effect dominates the income effect because of lower social stigma. As constraints to educational resources loosen, female education improves; so is their ability to occupy white-collar jobs upon school completion. This leads to a large increase in women entering the labor force. The social norms then become costlier to enforce, and their imposition declines. Goldin [2024] added that the rise of part-time employment and the emergence of household conveniences such as appliances and frozen food contributed to altering the female labor supply function. Despite the general framework, Goldin acknowledged that differing contexts may lead to differing progress in women's economic status in relation to education. As argued by Goldin [2024], countries can even get stuck near the bottom of the U because

[8] The removal of marriage bars does not mean that discriminatory practices towards hiring had been eliminated [Committee for the Prize in Economic Sciences in Memory of Alfred Nobel 2023]. For instance, Goldin and Rouse [2000] showed that blind auditions which conceal the candidate's identity increases the probability of a woman being hired in symphony orchestras.

[9] Goldin [1977] studied in more detail the historical differences in the labor force participation between white and black women. She observed that black women exhibited higher labor force participation rates compared to white women. Updating the data up to the 2020s, Goldin [2024] showed that this pattern has persisted.

of social stigma and traditions about women's paid employment, and this is still the case in many countries in the world.

2.2. Evolution of the gender earnings gap and wage discrimination

One of Goldin's most significant early works was her analysis of the gender earnings gap in the US that was published in her 1990 book, *Understanding the gender gap: an economic history of women*, where she dissected the different factors behind the gender gap in the 19th and 20th centuries [Perrin 2024]. This book is widely considered the foundational work on the rise of women in the US labor force and its impact on the economy [Fitzgerald 2014]. Goldin showed that gender-based wage discrimination[10] had not been constant over time and only clearly manifested in the US at the turn of the 20th century as a product of institutional and organizational changes in the labor market.

Goldin established three core facts in her analysis of the gender earnings gap in the US.[11] First, the gap narrowed significantly during the American Industrial Revolution (1820-1850) and the rise of white-collar employment (1890-1930), both of which were associated with new employment opportunities for women even before the social movement towards equal pay. Second, the narrowing of the gap stalled and did not change much in the 20th century despite the major structural and social changes that occurred.

Third, the nature and magnitude of the gap, as substantiated by the first two points, changed over time. In the transition from agriculture to manufacturing, Goldin estimated that female wages nearly doubled relative to that of men, since female agricultural and domestic services wages had come from a very low base. However, in the late 19th century up to the early 20th century, occupation segregation became quite evident in manufacturing, which slowed the convergence in the gap. Women were confined in select industries and to jobs with no qualification requirements, little avenue for promotion, and piece-rate payment scheme. Goldin did not find, though, evidence of wage discrimination. She argued that monitoring output was quite straightforward in the manufacturing sector, so there was little room for non-productivity-related wage differentials. Much of the gender earnings differentials was because of difference in characteristics, primarily job experience.[12]

The surge of clerical jobs between 1890 and 1930 was beneficial for women for several reasons: earnings were higher, it incentivized them to finish secondary education, and working in an office was more acceptable for women than working

[10] Wage discrimination exists when workers with identical productive characteristics are paid lower wages because of the demographic group they belong to (e.g., based on gender, race, ethnicity, etc.).

[11] The discussion on the three core facts is heavily sourced from the Committee for the Prize in Economic Sciences in Memory of Alfred Nobel [2023] and Wright [1991].

[12] Nonetheless, Goldin [1990] emphasized that other forms of discrimination could be observed in this time. Women had little incentive to gain work experience and had no chance of promotion. Most women worked only up to ten years, possibly stopping because of marriage.

in a factory. The new employment opportunity provided by clerical jobs led to the increase in the relative earnings of women, but the intriguing finding by Goldin was that it was also in this sector where wage discrimination became prevalent. Goldin estimated that wage discrimination accounted for at most 20 percent of the gender wage differentials in manufacturing, while it was as much as 55 percent in office work in 1940.

How did this paradox in the services sector come about? Goldin explained that the institutional conditions of office work led to the persistence of discrimination. In contrast to the piece-rate payment scheme where wages were adjusted according to productivity, office work entailed more structured salary schedules and occupational ladders, which made measuring productivity more obscure. Instead, workers with longer tenures were rewarded with promotions and thus higher salaries. Women tended to have shorter tenures as they were likely to exit the labor market upon marriage, so employers possibly used gender as a basis for promotions amid limited information about one's productivity and the presence of imperfect incentives.[13]

Goldin made two major arguments in her book. First, the lessons from the past can be used to understand the gender differences in today's economy. Second, economic progress can lead to gender equality, but this should be accompanied by legislation and social change. The latter is echoed by Goldin and Katz [2002], emphasizing that genuine change in the economic and social status of American women was not simply reflected by higher labor force participation rates but by increased representation of women in career professions. The next subsection delves into the analysis of Goldin of such change that brought forward the significant shift in the economic role of American women.

2.3. The quiet revolution and the power of the pill

Goldin often mentions that women used to be relegated as secondary earners in the family and, unlike men, were likely to have jobs and not careers if they participated in the labor market.[14,15] Women's labor supply, especially those who were married, was less elastic and more sensitive to their husbands' income. In

[13] Goldin [1990] called this a form of "statistical discrimination." Statistical discrimination occurs when, in the absence of means to observe actual productivity, employers evaluate the potential productivity of workers based on the average characteristics of the group they belong to.

[14] The concept of "added worker effect" is an example where women are treated as secondary earners. It refers to the increase in female labor supply, particularly that of married women, when their husbands become unemployed. It assumes that married women have a lower attachment to the labor market and would only likely enter the labor force as a response to reduced family income due to the job loss of their husbands, especially during recessions.

[15] Goldin [2004] distinguished American female college graduates over the 20th century into five cohorts. Women who graduated in college between 1900 and 1920 either had a family or career. Those who graduated between 1920 and 1945 had a job first then a family. Those who graduated in 1946 until the mid-1960s had a family first then a job. Those who graduated in the late 1960s until 1980 established a career then had a family. The last cohort, which graduated between 1980 and 1990, had a career and a family.

a series of studies, Goldin and her coauthors saw and analyzed the sharp turning point—akin to a structural break—between the early 1960s and the late 1970s in young women's expectations about their future work life, college graduation rates, choice of degree programs, age at first marriage, and labor force participation rates (Goldin [2005,2006]; Goldin and Katz [2000,2002]; Goldin et al. [2006]), all of which demonstrated that women were becoming more inclined to having a career. Goldin [2005,2006,2024] characterized this period where the modern economic role of American women emerged as the "quiet revolution".[16]

Before the turning point, Goldin [2005,2006,2024] and Goldin et al. [2006] observed that young women formed their labor market expectations based on the labor market outcomes of their mothers. However, in 1975, more young women expected to be working at the age of 35, which was more than double than what was observed seven years prior. Since investments in education are mostly made by people when they are young, expectations about future employment prospects are an important factor in deciding how much to invest in education. The changing expectations of young women about their employment thus led to increased college attendance and completion.[17] And it was not just college attendance that changed. Women took more math and science courses in high school such that, in the 1970s, women's degree program choices shifted from "consumption" degrees to "investment" degrees. More women opted to take professional degree programs such as medicine, law, business, and dentistry—meaning, their choices were becoming more similar to those of their male peers. Unsurprisingly, given the greater and longer human capital investments being made by women, a large increase in the median age at first marriage was observed within a short period of time, which was 23 years for those born in 1949 versus 25.5 years for those born in 1957.

What propelled the quiet revolution? There are several potential factors, as the turning point identified by Goldin coincided with prominent legislative and social changes. The government legally prohibited discrimination in employment practices and directed equal treatment in educational programs. The period was also known for the resurgence of the feminist movement. While recognizing the roles of these events in the quiet revolution, Goldin and Katz [2000,2002] offered a novel explanation: the diffusion of the oral contraceptive, simply known as the "pill."

Goldin and Katz [2000,2002] built on the premise that the reliability, ease of use, and feminine control of the pill lowered the cost of making longer-time career investments for women. The pill, they argued, reduced the uncertainty regarding pregnancy and lowered the cost of delaying marriage for women, especially those

[16] Goldin [2006,2024] contrasted the "quiet revolution" to the "noisy revolution." The former was characterized by the changing education and career choices made by women. The latter was marked by the civil rights, anti-war, and women's liberation movements that started in the 1960s.

[17] Goldin [2024] noted that women's increased college attendance in the US has continued until today and can now be observed globally.

who wanted to pursue a career.[18] The US Food and Drug Administration approved the use of the pill in 1960, but there was differential access to the pill. Although married women immediately gained access, minors required parental consent, thus limiting the diffusion of the pill to young, unmarried women. Goldin and Katz [2002] took advantage of the differential effect of legal changes in the age of majority and rights of minors by cohort and state. They found that these legal changes are positively associated with the age at first marriage and the proportion of women in professional degree programs, thus establishing "the power of the pill" in raising the age at first marriage and encouraging more women to take professional degree programs. Goldin [2006,2024] claimed that the increase in female labor force and employment was an "evolutionary" change, but the change in women's expectations, in their sense of identity, and in their newfound ability to better control their destinies was a "revolutionary" change.

2.4. Remaining barriers

In her historical and empirical accounting of the evolution of women's economic role in the US from the 18th to the 20th century, Goldin has drawn attention to the progress made towards gender equality in the labor market. In the US, the gender gap in college attendance had disappeared in 1980 and reversed in the 2000s as more women relative to men are going to college [Goldin et al. 2006]. As a result, although differences in human capital and occupational choices accounted for much of the gender earnings gap in the past, these have become less important amid the convergence of human capital investments between men and women. For example, Blau and Kahn [2017] estimated that human capital factors (i.e., education and experience) only account for eight percent of the gender earnings gap in 2010 compared to 27 percent in 1980 in the US. Goldin's more recent research focuses on the sources of the remaining gender gap in earnings, particularly the earnings per unit of time or the wage. While the earnings of women relative to men are at near-parity at the beginning of their working lives, the relative earnings of women decline with age, and the gender earnings gap widens over the life cycle [Goldin 2024]. This is especially observed among college graduates and in high-paying occupations.

Goldin [2014] argued that much of the gender earnings gap is occurring within occupations and not much between occupations. This is based on the proposition that some occupations have a nonlinear (convex) pay structure with respect to hours worked; such that people laboring long hours and working particular hours are rewarded with a higher wage per hour, while people who want fewer hours of work and a more flexible working environment are penalized with a lower wage per hour. Goldin and Katz [2011,2016] and Goldin [2014] developed a

[18] Goldin and Katz [2000,2002] postulated that, with the introduction of the pill, all women can delay marriage and not pay a large penalty, i.e., in terms of being left out in the marriage market. This suggests that the pill created a "thicker" marriage market for career-oriented women.

compensating differentials framework to formally understand how the nonlinear hours-wage relationship comes about. They proposed that temporal flexibility is an amenity that people are willing to pay for and that firms may allow at a cost. The costs of temporal flexibility vary by firm or sector, and these depend on the substitutability between employees.[19] The costlier it is to allow an employee to assume the work of another employee, the higher is the cost of temporal flexibility. Since women are usually the on-call parents and the men the on-call employees, it is the women who have the disproportionate demand for temporal flexibility. Therefore, gender differences in pay do not arise from productivity-related factors but from differential preferences and costs associated with the amenity of flexibility.

Focusing on US college graduates, Goldin [2014] estimated that occupations with higher elasticities of annual earnings with respect to weekly hours have a larger gender earnings gap.[20] Inflexibility at the workplace, Goldin argued, adversely affects women's labor supply and earnings as they take on greater child-rearing responsibilities. One example where any time off is heavily penalized is business occupations. Bertrand et al. [2010] found that male and female MBA graduates have nearly similar earnings at the onset of their careers. Their earnings, however, significantly diverge and grow a decade after graduation. New MBA mothers, particularly those with higher-earning husbands, tend to reduce their labor supply as indicated by greater career interruptions and shorter weekly work hours, leading to substantial declines in women's earnings. On the other hand, the labor market outcomes of men are unaffected by parenthood and, if anything, their earnings increase over time. The same results are found for male and female law graduates, which is another field where temporal flexibility is quite costly [Goldin 2014].[21] In contrast, pharmacy is a female-dominated, high-earning profession with low gender earnings gap, that Goldin and Katz [2016] described it as "a most egalitarian profession." They explained that technological changes in the pharmacy industry and the shift from self-employment to employment in retail chains and hospitals all reduced the penalty to part-time work. Hence, little work interruptions were observed among female pharmacists even if they have children. As a thought for policy, the authors also demonstrated that the narrowing of the gender earnings gap in pharmacy has little to do with family-friendly workplace amenities and is more consistent with the change in the structure of work.

[19] Using O*Net data, Goldin [2014] associated the following job characteristics with low degree of worker substitutability: greater time pressure, frequent contact with others, more interpersonal relationships, highly structured work, and greater freedom to make decisions.

[20] Business occupations have the largest elasticities, while technology, science, and health occupations have the lowest.

[21] Like what was found in MBA-related careers, Goldin [2014] showed that part-time work for lawyers is insufficiently remunerated, thus discouraging married women with children from becoming or remaining employed. This is especially observed among women with high-earning husbands.

Goldin [2021a,2024] called the jobs that are demanding more and inflexible time from employees as "greedy work" and stressed that it is the structure of work that perpetuates gender inequality as women balance career and family. The greedier the work is, the more expensive it is for couples to have equity. Goldin explained that, instead of both taking flexible work, it is more rational that one of them gets the greedy but higher-paying work (usually the husband), while the other takes the more flexible but lower-paying work (usually the wife). The labor market, Goldin argued, incentivizes them to specialize.

But what happens to the gender earnings gap when children grow up and the demand for childcare is reduced? To answer this, Goldin et al. [2022] estimated the parental gender gap which is composed of the motherhood penalty, the price of being female, and the fatherhood premium. As children grow up, mothers increase their hours of work relative to fathers, so they experience an increase in earnings. The earnings gap between mothers and fathers, however, does not change much because of the motherhood penalty and the fatherhood premium. Goldin [2024] explained that women's earnings fell and never recovered with the event of a birth and saw that gender differentials in earnings hold even in countries with family-friendly policies.

With the role parenthood plays in the persistence of gender inequality, Goldin [2021a] explained that anti-discrimination laws and fair employment policies are valuable but not enough to address the gap. In other words, even without discrimination, she argued that the gender gap would persist because of the tendency of married women to take on more childcare duties.[22] Goldin [2021,2024] instead emphasized the need to make fundamental changes in the way we work, make the workplace less greedy, make flexible work more productive, and recognize the importance of childcare to remove the remaining barriers to gender equality. The COVID-19 pandemic, Goldin [2024] noted, interestingly reduced the time demands in certain greedy occupations and increased the productivity of those with flexible jobs as firms and workers learned how to use technology to work from home. She argued that these changes benefited caregivers, especially women.[23]

3. Goldin's influence on economics and policy

Goldin's work shows how powerful it is to combine history and economics in explaining what happened and why such things happened to women in the labor market [Committee for the Prize in Economic Sciences in Memory of Alfred Nobel 2023]. Majority of Goldin's work, especially the earlier ones, is positive in nature and does not make normative policy prescriptions, but this does not mean that her work does not have policy implications [Committee for the Prize in

[22] Goldin [2024] observed that single mothers, unlike mothers with a husband or partner present, have higher employment rates. Furthermore, they take care of their children. They do not have the luxury of specialization.
[23] Goldin [2024] quipped that work from home has its benefits as long as it does not become "work from hell".

Economic Sciences in Memory of Alfred Nobel 2023]. The following are some of the insights from Goldin's research that can be useful for policy.

First, the sources of the gender gap are not constant and are changing over time as the economy transitions from one stage of development to another [Committee for the Prize in Economic Sciences in Memory of Alfred Nobel 2023]. Goldin's [1990] comprehensive and long-run account of the gender gap in the US is the precursor to discovering that the relationship between female labor supply and economic development is U-shaped. Her later analysis in Goldin [1995] demonstrated the external validity of the US case, and studies that replicated this research arrived at the same finding (e.g., Mammen and Paxson [2000]; Olivetti [2014]). Recent data by income group does imply a U-shaped pattern. The female labor force participation rate is highest in low-income countries at 61.4 percent, lowest in lower-middle-income countries at 41.9 percent, and relatively higher in upper-middle-income countries and high-income countries at 58.5 percent and 55.6 percent, respectively.[24]

As countries are at different stages of development, Goldin's work can be used to investigate which factors are primarily driving the gender gap and the interactions between these factors while acknowledging contextual differences. What can be learned from US history is that better employment opportunities, coupled with better education, enabled women to enter the labor market and that social stigma consequently becomes more expensive to maintain [Goldin 2024]. Nonetheless, Goldin's studies also suggest that policies that support better education for women would not necessarily lead to a reduced gender gap, and improved education outcomes for women are not necessarily a product of advanced economic development. For instance, Goldin [1995] cited Korea, a newly industrialized economy at the period of her study, as an example where women's representation in the clerical sector remained very low despite the significant progress in women's education. She also mentioned the Philippine case which was characterized by much lower income than the newly industrialized Asian economies, but where schooling levels were quite high. As a contemporary example, the educational attainment of women has been improving in India which is attributed to increased public expenditure on education. However, female labor force participation is seen to be declining, and one factor is restrictive social norms about women engaging in paid work, especially in rural areas [Mehrotra and Parida 2017].

Second, it is important to determine the root causes of the gender gap for policy that seeks to increase female labor market representation and earnings to be effective. The gender earnings gap has significantly narrowed, especially in high-income countries. However, the gap remains persistent, and the progress towards reducing the gap seems to have stalled. Parenthood is a commonly cited explanation behind the remaining gender earnings gap, and Goldin's research has inspired the proliferation of studies that analyze the effect of family policies on

[24] ILO modelled estimates in November 2023 for women aged 25 years and above.

female labor supply and earnings [Committee for the Prize in Economic Sciences in Memory of Alfred Nobel 2023]. For example, Albanesi et al. [2023] studied family policies in 24 countries and found little evidence on the benefits of longer parental leaves.[25] Instead, generous childcare support in terms of public provision or subsidies appears to encourage female labor force participation where subsidized childcare replaces maternal childcare.

On a related note, Goldin [2014] and Goldin and Katz [2016] have shown that parenthood does not have to result in diverging earnings between mothers and fathers. In occupations that do not heavily penalize temporal flexibility (i.e., less greedy), like pharmacy, women have high representation, and the gender earnings gap is small. Goldin [2021a] acknowledges that it would be difficult to make work more flexible and less greedy on a wider scale; but lowering the cost of childcare, say, through subsidized childcare, can at least make parental time less critical. Nonetheless, it should also be noted that the increase in age at first marriage and reduction in fertility have not always been associated with more women having careers. Goldin and Katz [2000] considered Japan as an example where there had been increased age at first marriage and reduced birth rate,[26] but these did not coincide with career changes among women. Looking at more recent data, Goldin [2024] also noted that the labor force participation of prime-age women in Japan already surpassed that of the US, but a large share of employed Japanese women still work fewer hours and are not in lifetime jobs that bring higher earnings and benefits. The Japan case thus demonstrates the importance of identifying the root causes behind low female engagement in career-oriented work.

Third, realizing the effects of policy, social, and other changes on female labor supply and earnings can take a long time. Human capital investments, especially those involving advanced education, require long-term commitment and are usually made by younger cohorts. Therefore, policies that encourage people to acquire more education would have a lagged effect on labor market outcomes. More importantly, as Goldin reiterated in several studies, changing career expectations are an important determinant of human capital decisions. In the US, for example, expectations of young women on whether they would be working at age 35 had changed over time as information about their future employment was updated and became more accurate for each succeeding cohort. Greater career expectations incentivized more young women to go to college, choose professional career programs, and eventually work in career-driven occupations that were previously dominated by men. These suggest two things that need to be considered when studying female labor market outcomes. For one, differentials

[25] The authors argued that longer parental leaves only delay the return of mothers to the labor market, which results in shorter work experience. Nonetheless, they did not find any consequences of longer maternal leaves on the careers of mothers.

[26] The authors added that the pill was made available in Japan only in 1999. They further argued that the pill is not a requirement for changing careers, but the pill is one mechanism which enabled women to better plan for their careers at an early stage.

in labor market outcomes, such as by cohort, can also be examined rather than just aggregate outcomes. For another, unlike that of men, women's decisions over their labor supply greatly vary over their life cycle.

4. Conclusion

For almost 50 years, collecting novel data, employing empirical methods, using historical context to situate economic and social issues faced by women, and grounding research on economic theory have been central to Goldin's work in understanding women's labor market outcomes; the process towards the convergence in gender-based market participation, career, and earnings; and the remaining sources of the gender gap. Owing to Goldin's expertise in economic history, her work is greatly rooted in history but clearly is still relevant in present times. As Goldin [2021b] said, "[k]nowing the barriers that stood in the way and came down makes us more aware of current impediments." Goldin also established the first unified framework in explaining the gender disparities in the labor market, centering around family, career, structure of work, and economic development. And although most of her studies do not make normative prescriptions, Goldin inspired many researchers to similarly collect historical data, explore alternative drivers of the gender gap aside from discrimination, and analyze the effect of parenthood on female labor market outcomes and diverging gender gaps between couples. Understanding the sources of the problem and pivotal factors for change—as what Goldin's research on women's work seeks to do—is crucial in forming policies and interventions that can properly address gender gaps and elevate the economic status of women.

Goldin's recent research is clearly geared towards gender and couple equality and argues that making work more flexible benefits both women and men. As Petrongolo [2024] aptly articulated, the pursuit of gender equality in economic opportunities is not necessarily a zero-sum game where one group's success is detrimental to that of the other. Breaking the remaining barriers to achieving gender equality in opportunities will lead to a more equitable and efficient society where the potential contribution of every individual is fully realized. Goldin's key role in paving the way for the economics of women and work to be recognized in mainstream economics cannot be understated.

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