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ABSTRACT

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In urban China, gender gaps in employment and earnings have steadily increased since the 1990s. Such gender gaps are important because pension rights and amounts are based on labor force participation and wages. However, as this study demonstrates, despite the rise in gender differences in the urban labor market, the average gender pension gap decreased between 1988 and 2018. In the paper, we describe the evolution of the fragmented pension system in urban China using a quantitative approach that distinguishes between pension coverage rates and average benefit amounts. Additionally, we conducted a birth cohort analysis to gain further insights into the reasons for changes in the gender pension gap. We utilized data from the China Household Income Project, focusing on individuals aged 60 years and older. Therefore, this study demonstrates how changes in China's pension system have benefited women more than men during the aforementioned period.

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In this study, we present the first empirical analysis of the evolution of the gender pension gap in urban China over three decades, from 1988 to 2018. This evolution is of particular interest because, in situations where most older adults receive the majority of their income from pensions, it indicates the degree of gender inequality. In contrast to rural China, pensions are the most important source of income for older adults in urban China. It is true that some older adults in urban China also receive income from other sources; however, in most cases, these sources are not as significant as pensions. For example, only a minority of older adults in urban China participate in the labor force after reaching the standard retirement age.

The gender pension gap resembles the better-known gender pay gap, which measures the degree of gender equality in wages. A functional relationship may exist between the gender wage gap and the gender pension gap since the pension amount an individual receives after retirement tends to be positively related to his/her work history. People who have worked many years for high wages usually receive larger pension benefits when they reach pension age than their peers with a shorter work history and/or low wages. Owing to interruptions associated with motherhood, earlier exits from the labor market, and fewer working hours, women typically receive lower pensions than their male counterparts (Bettio et al., 2013). Consequently, most societies have a gender pension disparity in which women are disadvantaged. It is well known that since the 1990s, the employment gap between men and women has increased in urban China, and the gender wage gap has simultaneously widened.[1]

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[1] According to urban data from the China Household Income Project (CHIP), for the population aged 20–59, the wage ratios of women to men were 0.79 in 1988, 0.81 in 1995, 0.72 in 2002 and 2013, and 0.68 in 2018. The ratios of women's labor

Accordingly, one would easily assume that the gender pension gap in urban China has also increased since the 1990s.

However, our estimates of the gender pension gap in urban China for the 1988–2018 period show no evidence of an increase. Using data from the China Household Income Project (CHIP) for urban residents aged 60 years and older, referring to the years 1988, 1995, 2002, 2013, and 2018, we show a rapid decrease in the gender pension gap. The fact that, in 1988, urban men aged 60 and older received, on average, 280% higher pensions than urban women can serve as an illustration of this trend. In 2018, this percentage decreased to approximately half (147%). These changes have reduced the Average Gender Pension Gap (AGPG) in urban China to a level comparable to that in many European Union countries (Bettio et al., 2013).[2]

Next, we elucidated this development by demonstrating that the main factor behind the decreased gender pension gap in urban China is changes in China's pension system. In 1988, as few as 40% of women aged 60 years and older living in urban China received pensions, compared to 78% of men. Subsequently, the proportion of older urban women receiving a pension increased in each of the years included in this study. In 2018, the percentage of urban women aged 60 years and older who received pensions was 84%, which is almost equivalent to that of urban men. Moreover, we observed that, over the three decades studied, the average pension received by men was 40% higher than that received by women. To understand these changes better, we used two decomposition approaches.

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participation rate to that of men were 0.88 in 1988 and 1995, 0.80 in 2002, 0.79 in 2013, and 0.78 in 2018. For a description of the gender wage gap and its determinants, see, for example, Gustafsson and Li (2000), Feng et al. (2017), and Iwasaki and Ma (2020).

[2] The EU-27 average in 2009 was 139%. The two highest values corresponded to Luxembourg (147%) and Germany (144%). The Slovak Republic (108%), then Estonia (104%), had the lowest gender pension gap at the other extreme.

The remainder of this paper is organized as follows. Section II presents a review of literature on the gender pension gap in China, while Section III describes how gender gaps in the urban Chinese labor market have widened since the 1990s. Section IV introduces China's fragmented pension system and its development since the end of the 1980s. Section V presents the data used in this study, and Section VI reports the AGPG at the macro and micro levels. Section VII introduces a new decomposition approach and reports the impact of pension reforms on the AGPG, while Section VIII presents a cohort analysis aimed at elucidating the changes in pension coverage and benefits. Finally, Section IX summarizes this study and discusses its results.

II. Literature review

Although several studies on the gender pension gap in developed countries have been conducted, this topic has been largely neglected in China. Among the pioneers of this topic were Chen and Turner (2015), who focused on the largest mandatory public pension program in urban China, the Urban Employees' Pension (UEP) program. Using data from the China Health and Retirement Longitudinal Study (CHARLS) for 2011, those authors found that the gender gap in pension benefits was smaller than that in earnings, while the reverse was true for many other countries. However, Chen and Turner (2015) did not consider the fact that many women were not eligible for the Urban Employees' Pension (UEP). As shown in Table 2, when this fact is considered, the conclusion changes.

Two studies utilized data from the 2013 CHARLS to investigate pensions received by individuals in rural and urban China. In the first, Zhao and Zhao (2018) focused on the gender pension gap among people aged 60 and older. They found that, on average, women receive only half the social pension men do. Furthermore, nearly three-quarters of the gender pension

gap can be attributed to the lower likelihood of women receiving occupational pensions, which are offered to government employees and state-owned enterprises (SOEs). The lower amounts of occupational benefits received by women explain the remaining one-quarter of the gender pension gap. Zhao and Zhao (2018) concluded that women's disadvantages related to labor force participation, employment sectors, and earnings are the primary drivers of the gender pension gap.

Using the same dataset, Zhu and Walker (2018) focused on the determinants of pensions among rural and urban residents and estimated a hierarchical linear model. On average, women received 30% lower pensions than their male counterparts. However, much of this gap was eliminated when the estimated model variables for individual characteristics and human capital were included. This study further illustrates that the gender pension gap is small in comparison to the pension gap between urban and rural inhabitants.

While Zhao and Zhao (2018) and Zhu and Walker (2018) included older rural residents in their analyses, Chen and Turner (2015) focused on urban residents, which is similar to our study. However, unlike these previous studies, we analyzed the evolution of the gender pension gap over three decades rather than limiting our analysis to a single year. This difference is important. For example, Zhao and Zhao listed women's disadvantages in labor force participation, employment sectors, and working-age earnings as the primary drivers of the gender pension gap. However, we found that changes in the urban pension system were advantageous for women between 1988 and 2018.

Our study is also similar to that of Li et al. (2020), who studied pensions in China using a repeated cross-sectional design and also used CHIP data for the years 1988, 1995, 2002, and

2013. A minor difference is that our study includes data for the year 2018 as well. More importantly, Li et al. (2020) investigated income inequality among households with at least one member aged 60 years or older living in rural or urban areas, not the gender pension gap.[3]

III. Increased gender differences in the urban Chinese labor market

Before economic reforms were institutionalized during the 1990s, employment was relatively high among men and women in urban China. The gender wage gap was small, according to international standards (Gustafsson and Li, 2000). This started to change with enterprise reforms in the 1990s, when state-owned enterprises (SOEs) faced strict budget restrictions and lifelong relationships between workers and enterprises were terminated. Consequently, open unemployment rose, and a substantial number of workers left the workforce (Feng et al., 2017). Under these new circumstances, female workers were more severely impacted. They left the labor force in larger numbers than men (Hare, 2016). This occurred against the backdrop of limited public involvement in child and older adult care, in combination with traditional gender roles in Chinese society. During those years, new employment opportunities became available in the expanding private sector.

The increasing gender differences in urban China since the mid-1990s are also evident in the evolution of the gender pay gap. In a meta-analysis of research on the gender pay gap during the 1978–2018 period, Iwasaki and Ma (2020) concluded that the available literature strongly suggests that the gender wage gap in China has dramatically increased during the last two decades.

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[3] Li et al. (2020) found that pension income was a large contributor to the observed increase in income inequality among older adults, a conclusion also drawn by Hanewald et al. (2021) after analyzing the 1991–2015 China Health and Nutrition Survey.

Since the pension amount received by an individual is linked to his/her previous activities in the labor market, the reduced involvement of females in the labor market could have increased the gender pension gap in urban China. However, this prediction assumes that no significant changes occurred in the pension system during the period. In the next section, we demonstrate that, in reality, changes in the pensions of workers with urban *hukou* (i.e., household registration) benefited women more than men.

IV. Pensions in urban China

The Chinese pension system is complex and has undergone several changes throughout the years. In this section, we describe important characteristics of this system that are relevant to our research questions. At the time this study was undertaken, there were four types of *pensions* in China, with a total coverage rate of approximately 80% (Fang and Feng, 2018; Li et al., 2020; Jia et al., 2021). They were as follows: the **Urban Employee Basic Pension (UEBP, 城镇职工基本养老保险)**, received by the employees of for-profit enterprises; the **Public Employee Pension (PEP, 机关事业单位养老保险)**, received by civil servants and employees of non-profit government institutions, such as schools and health institutions; the **Urban Resident Social Pension (URSP, 城镇居民社会养老保险)**, received by urban residents who did not have formal non-agricultural jobs; and the **New Rural Resident Social Pension (NRRSP, 新型农村居民社会养老保险)**, received by rural residents aged 16 years and older who did not have formal non-agricultural jobs. Since 2014, the URSP and NRRSP have been gradually integrated into the **Urban–Rural Resident Basic Pension (URRBP, 城乡居民基本养老保险)**. In 2015, the PEP was combined with the UEBP. Owing to these changes, we

grouped pension schemes into two categories: the **Urban Employee Pension (UEP)** and the

Resident Social Pension (RSP).[4]

Next, we describe the evolution of China's pension system during the study period, considering

six categories of workers (Figure 1).

<Insert Figure 1 here>

China's pension system faces several major issues (Shen, 2018). In 1969, the pension system

of SOEs moved from a social pooling system to a pure enterprise burden system. This led to a

large problem with funding pensions for people who worked in loss-making enterprises. Many

adults over the common pension age did not receive any pension. In response to these issues,

as early as 1984, some cities introduced social pooling at the district or county levels.[5]

The fact that many retired women in urban China did not receive pensions until 2010 is

pertinent to this study. The reasons behind this situation are complex and include the fact that,

for decades, many women did not obtain formal employee status. This is understandable given

that there has been an oversupply of labor in urban China for many years. For example, after

1976, millions of educated young people (*Zhi Qing*) returned to cities from the countryside,

forcing many workers to exit the labor force via early retirement funded by enterprises.

Furthermore, in urban China, the survival of traditional gender roles means that male workers

are expected to be the primary providers in a household.

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[4] Thus, we followed Giles et al. (2021), who studied the impacts of the two systems on retirement and labor supply.

[5] In the following decades, coordination gradually changed to the provincial level—at the time of writing, national-level coordination has not yet been achieved. Provinces with serious population aging problems, such as Liaoning, are experiencing severe pension fund shortages, while provinces with larger numbers of young immigrant workers, such as Guangdong, have a large surplus of pension funds. In 2018, the Chinese government introduced the central adjustment fund system to balance pension funds nationwide. However, at the time of writing, the amounts paid to this fund have been small.

There are six categories of pensioners currently living in urban China (Table 1).

Group A: Staff of government agencies and institutions. These employees, in some sense, have the most generous pensions**.** The history of these pensions can be traced back to 1958. This year, the State Council promulgated the Interim Regulations of the State Council on the Retirement of Workers and Staff, covering workers employed by government institutions, enterprises, and organizations. It should be noted that these workers did not have to contribute to their retirement savings. This system was changed in 2015, when the State Council issued the Decision on the Reform of the Pension Insurance System for Staff in Public Agencies and Institutions. It replaced the pension system for government agency staff with urban employees' basic pension insurance. Subsequently, government organizations had to pay pension contributions, contrary to what had previously been the case.

Group B: Formal employees of SOEs and collective enterprises. Initially, formal employees of SOEs and collective enterprises were not compelled to make pension contributions but received government-funded pensions. However, the responsibility for pension payments gradually shifted to enterprises in the 1960s. Some enterprises could not bear this liability. It resulted in former employees receiving considerably lower pensions or, in some cases, no pension at all. In 1984, a key development occurred when the Decision of the Central Committee of the Communist Party of China on Economic System Reform changed the status of SOEs to "self-funded entities." In the years following this reform, several SOEs suffered severe losses and could not meet their pension obligations. This led to attempts to create coordinated pensions in some locations. Therefore, in 1986, the State Council promulgated the Interim Regulations on the Implementation of the Labor Contract System in SOEs. Furthermore, it implemented the contract labor system for all new SOE employees and regulated retirement pensions for existing workers.

Since the end of the 1980s, formal employees of SOEs and collective enterprises have had to pay pension contributions under the basic pension insurance policies. In 1991, the State Council issued the Decision on the Reform of the Basic Pension Insurance System for Enterprise Employees. It established a system that combined basic pension insurance with supplementary enterprise insurance and employee personal savings pension insurance. Individual contributions paid by workers ranged from 3% to 16% of the wages. However, in 1997, the central government implemented national unified pension rules via the Decision on Establishing a Unified Basic Pension Insurance System for Enterprise Employees. It standardized pension contributions by employees in all types of enterprises across China at 8% of wages and those by employers at 20%.

Group C: Informal employees of SOEs and collective enterprises. For several years, many workers in urban China did not have formal employment status. This was particularly the case (and still is) in segments of the workforce with a relatively high proportion of women. However, in 2010, the Ministry of Human Resources and Social Security and the Ministry of Finance's Opinions on Solving the Remaining Issues of Basic Pension Security for Uninsured Retirees from Collective Enterprises stipulated the following: "Anyone who has urban household registration (*hukou*), whose age exceeded the statutory retirement age at the end of 2010, and in addition has established de facto labor relations with urban collective enterprises, could receive pension benefits if they made a lump-sum payment of 15 years of basic pension insurance contributions." This reform increased the rate of employee pension coverage among urban women.

Group D: Employees of private enterprises. After decades of formal non-existence, in 1981, private enterprises (initially, enterprises with fewer than eight employees) were allowed to operate in the People's Republic of China. In 1988, an amendment to the Constitution of the People's Republic of China officially recognized the private economy. This resulted in rapid expansion, with the number of employees in private enterprises increasing from 14,000 to 2,012,000 (Wu, 2010) between 1989 and 2000. By 2019, the number of private employees had increased to as many as 228,330,000.[6] However, private enterprises' willingness to participate in pension insurance was low. Even in the 2010s, far from all rural–urban migrant workers received any social security benefits (Li and Xing, 2016). According to the 2018 CHIP urban sample data, the proportion of individuals of pension age who received the UEP and had been employed by private enterprises before retirement was as low as 41.5%. This can be compared to 95.3% among those employed by SOEs before retirement.

Group E: Self-employed/flexibly employed individuals and land-lost farmers. Individuals in this category had no previous employers and are predominantly male.[7] In 2005, the State Council promulgated the Decision to Improve the Basic Pension Insurance System for Enterprise Employees. Subsequently, self-employed and flexibly employed individuals could voluntarily join the UEP. This special category also includes farmers who lost their land due to urbanization and subsequently migrated to cities to become urban residents. To address this issue, in the 1990s, the Shanghai government formulated the Land Requisition for Pensions (*Zheng Di Yang Lao*), and other jurisdictions soon followed. In 2004, these reforms were codified when the State Council promulgated the Decision of the State Council on Deepening Reform and Strict Land Management to be applied nationwide.

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[6] Data source: National Bureau of Statistics of China website, https://data.stats.gov.cn/easyquery.htm?cn=C01
[7] According to Table 2, the sum of the proportions of self-employed, flexibly employed, and land-lost farmers in the urban population aged 16–59 years increased from 0.8% in 1988 to 42.9% in 2013.

Group F: Others who did not work for earnings. For decades, these residents did not receive any pension. However, the New Rural Resident Social Pension (NRRSP) and Urban Resident Social Pension (URSP), established in 2009 and 2011, respectively, were gradually combined to form the Urban–Rural Resident Basic Pension (URRBP). Subsequently, men and women aged 60 years and above could receive an RSP, funded mainly by government resources.

<**Insert Table 1 here**>

In summary, state institution employees have historically earned the most generous pensions in urban China. Systems that regulate the pensions of SOE employees have changed frequently as the number of SOE employees initially fell rapidly during the reform period but has stabilized more recently. Additionally, in recent times, the private sector has emerged and currently employs a large proportion of the urban labor force. At the end of the 1980s, substantial segments of the urban population were ineligible for pensions, many of whom were women. Later, Chinese pension reforms broadened eligibility, now covering most older adults living in urban areas with urban *hukou*. Furthermore, considering the topic of this study, it can be assumed that the gender pension gap differs among people belonging to different birth cohorts.

This study examined changes in the gender pension gap and the consequences of pension reforms. The following sections address several important questions: (1) How has the status of the gender pension gap in urban China developed during recent decades? (2) How do the coverage and average benefits of different pension types affect the gender pension gap? (3) Based on the exploratory analysis of different birth cohorts, what are the possible drivers of the

gender pension gap: Are the changes in specific pension coverage or benefits driven by pension reforms or other factors?

V. Data

In this study, we utilized data from the China Household Income Project (CHIP), which is conducted by the China Institute for Income Distribution at Beijing Normal University.[8] The five waves of CHIP data cover the income years 1988, 1995, 2002, 2013, and 2018. We focused on individuals aged 60 years and older living in urban areas and possessing urban *hukou*,[9] and employed data from provinces that were surveyed for all five years. Thus, the data cover people residing in the provincial units of Beijing, Liaoning, Jiangsu, Guangdong, Shanxi, Anhui, Henan, Hubei, Yunnan, and Gansu. Additionally, we used sample weights because the sample probabilities were not the same for all provinces.[10] Furthermore, the income variables were adjusted according to the 2018 price levels using the consumer price index.[11]

<Insert Table 2 here>

Table 2 reports descriptive statistics for each of the five years surveyed. The following observations can be noted:

(1) The employment structure of the population changed dramatically during the study period. The proportion of formal workers in government institutions and SOEs decreased from 78% in 1988 to 16% in 2013, after which changes were negligible. In

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[8] More information can be found at www.ciidbnu.org/chip.

[9] The definition of "urban" is the same as that applied by the National Bureau of Statistics in China.

[10] Documented by Sicular et al. (2020) and updated by the authors.

[11] Since it is not possible to fully identify all spouses from the available data, for the "pension gender gap for couples" index and the pension gender gap, which assume that a couple's pensions are fully shared, we selected a subsample comprising the heads of households and their spouses aged 60+ years.

contrast, the proportion of private and informal sector workers and residents not participating in the labor force increased significantly. This finding is consistent with the expansion of the pension system for non-state workers until 2013.

(2) With the establishment of the New Rural Resident Social Pension (NRRSP)and the Urban Resident Social Pension (URSP) reforms in 2009 and 2011, respectively, the proportion of people participating in the Urban Employee Pension (UEP) declined, that of people participating in the Resident Social Pension (RSP) increased, and that of people without pensions declined.

(3) We calculated the percentage of women belonging to each population type (see Appendix 1). There are significant gender differences among the different categories of workers and pensioners. Owing to the changes in the pension system discussed above, a larger proportion of women have become eligible to receive a pension. The percentage of women participating in the UEP is lower than 50%, while that of women participating in the RSP and without pensions is nearly 60%. This finding indicates that differences in pension coverage have a direct impact on gender discrepancies.

VI. AGPG at the macro and micro levels

This study examined the impact of pension reforms on the gender pension gap. For this purpose, we took three steps. First, we presented Average Gender Pension Gap (AGPG) information for the 1988–2018 period. Second, we explained the impact of changes in pension coverage and the benefits obtained from these changes on the gender pension gap using a decomposition approach. Lastly, we examined the underlying causes of the changes in the gender gap in terms of both pension coverage and benefits among older adults belonging to different cohorts. We utilized regressions to explain the impact of pension reforms on birth

cohorts across different periods. Subsequently, we examined the gender pension gap at the average and household levels. To obtain the average levels, we used the following definitions[12]:

$$Average\ Gender\ Pension\ Gap\ (AGPG) = \frac{Average\ pension\ income\ of\ men\ in\ the\ population\ aged\ 60+\ years}{Average\ pension\ income\ of\ women\ in\ the\ population\ aged\ 60+\ years}, \qquad (1)$$

$$Average\ Pension\ Coverage\ Gender\ Gap\ (APCGG) = \frac{Pension\ coverage\ for\ men\ aged\ 60+\ years}{Pension\ coverage\ for\ women\ aged\ 60+\ years}, \qquad (2)$$

$$Average\ Pensioner's\ Benefit\ Gender\ Gap\ (APBGG) = \frac{Average\ pension\ for\ male\ recipients\ aged\ 60+\ years}{Average\ pension\ for\ female\ recipients\ aged\ 60+\ years}. \qquad (3)$$

Next, we examined the gender pension gap comprising couples only and across all types of households.[13] The former can be attributed to the allocation of paid work and unpaid housework within a household (Ponthieux and Meurs, 2015).

$$Gender\ Pension\ Gap\ for\ Couples\ (GPGC) = \frac{Average\ pension\ income\ of\ men\ among\ couples\ aged\ 60+\ years}{Average\ pension\ income\ of\ women\ among\ couples\ aged\ 60+\ years}, \qquad (4)$$

$$Gender\ Pension\ Gap\ if\ Couples'\ Pensions\ are\ Shared\ (GPGCS) =$$
$$\frac{Average\ shared\ pension\ income\ of\ men\ among\ couples\ aged\ 60+\ years}{Average\ shared\ pension\ income\ of\ women\ among\ couples\ aged\ 60+\ years}. \qquad (5)$$

Gender differences in the average pension coverage and benefits may be attributable to differences in its characteristics. Therefore, two questions must be considered: If men and women have identical characteristics, what is the AGPG? If individual characteristics do not change, why does the AGPG change? Using propensity score matching (Rosenbaum and Rubin, 1983), we constructed and matched data to calculate the gender pension gap in cases where women and men had identical individual characteristics.[14] The observed and matched gender pension gaps are presented in Table 3.

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[12] The rationale behind choosing these definitions was that we wanted to decompose the changes in the pension gender gap into contributions due to changes in pension coverage and contributions owing to changes in pension benefits. Bettio et al. (2013) introduced an alternative definition: Gender Gap in Pension $(GGP^{Bettio}) = 1 - \frac{women's\ average\ pension\ income}{men's\ average\ pension\ income}$. The relationship between our formula and that of Bettio et al. is $PGG = \frac{1}{1-GGP^{Bettio}}$ or $GGP^{Bettio} = 1 - \frac{1}{PGG}$. See Appendix 3 in Bettio et al. (2013).

[13] When studying the gender pension gap among couples, samples where both spouses were 60 years of age or older were used.
[14] A detailed description of the matching process and results can be found in Appendix 6.

The macro-level results (Table 3) are as follows. First, the observed AGPG decreased significantly from 2.80 to 1.43 between 1988 and 2018, with the most considerable decrease occurring between 1988 and 1995. Second, this decrease can be mainly attributed to an increase in women's pension coverage. While the gender ratio for pension coverage was as high as 1.95 in 1988, it was only 1.03 in 2018. Most of this decrease occurred in 2013, which is consistent with the discussion presented in Section V.[15] Third, there was no clear long-run trend in terms of the benefit gender gap for pension recipients because the gender ratio for pension benefits initially declined from 1988 to 2002 and then increased after 2002. However, when gender differences in individual characteristics are controlled, the ratio of female to male pension recipients increased continuously between 1995 and 2018.[16] The following sections further explain these changes.

Next, we examine the AGPG at the micro level. Figure 2 compares the gender pension gaps defined in Equations (1), (4), and (5). The following conclusions can be drawn:

(1) In 1988 and 1995, before the establishment of the unified Urban Employee Pension (UEP), the AGPG for the population aged 60 years and older was significantly higher than the gender pension gap for couples (GPGC). This means that the gender pension gap among older adults who were neither household heads nor their spouses was

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[15] If the gender and intertemporal differences in individual characteristics are removed, the gender ratio regarding pension coverage still shows a decreasing trend between 1988 and 2018. For detailed results regarding the gender pension gap, pension coverage gender gap, and pension benefit gender gap after cross-sectional and longitudinal matching, see Appendix 2.

[16] The observed average pensioner's benefit gender gap (APBGG) for 1995 was 1.37, while the longitudinally matched APBGG for 2002 was 1.44. These two numbers are more comparable since they are both based on the individual characteristics data for 1995. Similarly, the APBGG for 2002 and the matched APBGG for 2013 were 1.37 and 1.47, respectively. The APBGG for 2013 and the matched APBGG for 2018 were 1.43 and 1.44, respectively (see Appendix 2).

extremely high. Many older women were single or widowed and had relatively low pension coverage and benefits before the establishment of the unified UEP.

(2) The GPGC has always been higher than the gender pension gap for others, assuming that couples' pensions are fully shared. However, the differences between the two increased significantly after 2002. Thus, we conclude that pension sharing among couples plays an important role. The gender pension gap partially originates from decisions made by couples and reflects the pervasiveness of traditional gender roles.[17]

(3) In the event that a couple shares their pensions equally, there is a greater than 1 gender pension gap. This means that, even after excluding the sharing of pensions among couples, the gender pension gap still exists.

<Insert Figure 2 here>

VII. Decomposing changes in AGPG

In this section, we decompose changes in the AGPG into changes in pension coverage and pension benefits obtained from the **Urban Employee Pension (**UEP) and **Resident Social Pension** (RSP) to determine the reasons for the reduction in the AGPG. The changes in the gender pension gap can be expressed as

$$Change_{t,t-1} = \frac{\left(\frac{y_{m,t}}{y_{f,t}}\right)}{\left(\frac{y_{m,t-1}}{y_{f,t-1}}\right)} = \frac{y_{m,t}y_{f,t-1}}{y_{f,t}y_{m,t-1}}. \tag{6}$$

Taking the logarithm of Equation 6, we obtained

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[17] For an empirical analysis of gender identities and working hours among Chinese couples, see Ye and Zhao (2018) and Zhao et al. (2022).

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$$\ln(Change_{t,t-1}) = [\ln(y_{m,t}) - \ln(y_{m,t-1})] - [\ln(y_{f,t}) - \ln(y_{f,t-1})]. \tag{7}$$

A positive $\ln(Change_{t,t-1})$ means that the gender pension gap is increasing; conversely, if $\ln(Change_{t,t-1})$ is negative, the gender pension gap is decreasing. The first term on the right side of Equation (7) represents the contribution of the pension received by men. Taken separately, an increase in the pension received by men widens the gender pension gap. The second term represents the contribution of the pension received by women. Taken separately, an increase in the pension received by women narrows the gender pension gap. Let $y_{m,t} = b_{m,t}c_{m,t}$ and $y_{f,t} = b_{f,t}c_{f,t}$, where $b_{m,t}$ is the average benefit received by male pensioners, and $c_{m,t}$ is the pension coverage for men. Subsequently, the following equation is obtained:

$$\ln(Change_{t,t-1}) = [\ln(b_{m,t}) - \ln(b_{m,t-1})] + [\ln(c_{m,t}) - \ln(c_{m,t-1})] - \{[\ln(b_{f,t}) - \ln(b_{f,t-1})] + [\ln(c_{f,t}) - \ln(c_{f,t-1})]\}. \tag{8}$$

Thus, Equation (8) decomposes the difference in the logarithm of the change in the gender pension gap into changes in the pension benefits and coverage for men and women.[18]

Table 4 reports the decomposition of changes in the gender pension gap. Since the changes in the AGPG are all negative, they are multiplied by -1 (thus, a negative number indicates a narrowing AGPG). To understand the decomposition results better, we determined the coverage and benefits of different pension types for men and women between 1988 and 2018 (Table 5) and inferred the following:

(1) The main reason for the reduction in the AGPG was (unsurprisingly) the rise in pension coverage for women. The contribution of coverage changes to the AGPG reduction was as high as -87%, -99%, -135%, and -57% for each of the four periods,

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[18] A detailed description can be found in Appendix 3.

respectively. However, only during the period 2002–2013 was the main cause of the narrowing gender pension gap the establishment of the RSP, with its relative contribution amounting to -115%. There are two reasons for this trend. First, the RSP covered many people who were not covered previously by employee pensions. Second, the proportion of women in this category was greater than 50%.[19] During the other periods, the main cause of the reduction in AGPG was changes in UEP coverage. Specifically, UEP coverage increased faster for women than for men (Tables 4 and 5).

(2) Other than the 2002–2013 period, the changes in pension benefits reduced the AGPG. It shows that in the long run, the growth rate of women's UEP benefits was faster than that of men.[20] However, between 2002 and 2013, the changes in pension benefits contributed to an increase in the AGPG. This is because the establishment of RSP has changed the distribution of men and women in pension insurance. First, some women who may plan to receive UEP actually join RSP, thereby reducing the proportion of younger women in UEP and expanding the gender gap among UEP recipients. Second, as more women, who have a lower probability of being eligible for UEP, are able to receive RSP, the average pension of all female recipients drops from the original UEP level to a lower level between UEP and RSP. It will greatly widen the gender gap among recipients.

<Insert Table 4 here>

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[19] Additional evidence is provided in Table 5. Between 2002 and 2013, the proportion of older women not receiving pensions decreased from 29.1% to 22.5%, while the corresponding proportion among older men increased from 8.9% to 17.1%. There are two possible reasons for the rise in older men not receiving pensions. The first is increased rural–urban migration since many migrants do not receive a pension, and the second is the growing number of men working in the private sector.

[20] According to the cohort analysis in the next section, this is because the gap in UEP benefits between younger older women and senior older women is higher than that of men.

VIII. Cohort analysis

As discussed in the previous section, we found that changes in the coverage and benefits provided by the Urban Employee Pension (UEP) and the establishment of the Resident Social Pension (RSP) significantly affected the AGPG. Possible driving forces behind this phenomenon include reforms of the different pension types as well as other factors. Reforming a particular pension type may increase or decrease its coverage or affect the growth rate of the benefits it provides. However, it was difficult to fully elucidate the mechanisms involved in the analysis of the paper. In principle, a deeply rooted analysis requires information on the life experiences of each pensioner during their working years, which we could not access. Nevertheless, based on the decomposition analysis of different birth cohorts, we could examine what people in different birth cohorts may have experienced during various periods. Thus, this helps determine the driving forces behind changes in the AGPG.

In this section, we conduct a cohort analysis. This is to distinguish between consequences due to time and those specific to a birth cohort. Following Ohtake and Saito (1998), we utilized Equation (9) to estimate the time and cohort effects:[21]

$$Y_i = \beta_0 + \sum_{j \in \{2,3,4,5\}} \beta_{1,j} W_j + \sum_{p \in \{birth\ years\}} \beta_{2,p} D_{j,p} + \beta_3 Z_i + \mu_i, \quad (9)$$

where Y_i is the pension coverage or benefits for older adults and W_j is the dummy variable used to identify survey waves. Thus, $W_1 = 1$ when the data survey year is 1988 and 0 otherwise;

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[21] As an alternative, we also used a four-step approach to estimate the time and cohort effects. In that approach, we estimated the time effects of different periods (1988–1995, 1995–2002, 2002–2013, and 2013–2018) separately and only kept the sample with overlapping birth years for each estimation. After obtaining the time effect, we adjusted the data and calculated the cohort effects. The results of the four-step approach (reported in Appendix 8) are consistent with those of Equation (9).

W_2, W_3, W_4, and W_5 were defined using similar rules for the 1995, 2002, 2013, and 2018 waves of data, respectively. $D_{j,p}$ are dummy variables used to identify the birth years. Furthermore, Z_i represents the control variables, such as personal characteristics and regional dummy variables. $\hat{\beta}_{1,j}$ represents the estimated time effect, which is the average change experienced by all older adults. $\hat{\beta}_{2,p}$ represents the cohort effect. It reflects the differences in pension amounts among older adults born in different years compared to the base birth year.

To directly estimate the cohort effect of the gender gap, we extended Equation (9) as follows:

$$Y_i = \beta_0 + \sum_{j \in \{2,3,4,5\}} \beta_{1,j} W_j + \sum_{p \in \{birth\ years\}} \beta_{2,p} D_{j,p} + \sum_{j \in \{2,3,4,5\}} \beta_{4,j} \cdot man_i \cdot W_j +$$
$$\sum_{p \in \{birth\ years\}} \beta_{5,p} \cdot man_i \cdot D_{j,p} + \beta_6 man_i + \beta_3 Z_i + \mu_i, \quad (10)$$

where man_i is a dummy variable equal to 1 for older men and 0 for older women. $\hat{\beta}_{4,j}$ represents the estimation of the gender gap's time effect, which is the average change in the gender pension gap compared to the base year. $\hat{\beta}_{5,p}$ represents the estimated gender gap's birth cohort effect. This reflects the differences in the gender pension gap between older adults born in different years, with 1955 as the base year.[22]

If the estimated cohort effect is statistically significant, we can conclude that, for a given age, the pensions of individuals belonging to the given birth cohort differ from those belonging to an earlier cohort. Thus, the estimated cohort effect reflects the impact of pension reforms or other factors (e.g., an increased number of working-age people covered by pensions or changes in pension contribution rules).[23] If the time effect is statistically significant and positive, it

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[22] People born in 1955 were 60 years old in 2015.

[23] We inspected the birth cohort characteristics of pension coverage and benefits for men and women. If pension reforms occurred in the related years of a significant birth cohort effect, the result may be attributed to pension reforms. Otherwise, other possible causes should be identified.

indicates an increase in pension coverage or benefits (e.g., due to pension reforms) for older adults who have retired.

Next, we discuss these results. Table 6 reports the unconditional AGPG for different birth years, while Table 7 reports the time effect based on the regression equation (10), representing the gender-related changes in pension coverage and benefits over time within a given cohort (while controlling selected variables). Figure 3 illustrates the cohort effects on pension coverage and benefit gender gaps based on the regression equation (10). Figure 4 reports the cohort effects, $\hat{\beta}_{2,p}$ (i.e., the gaps between a given birth cohort and the 1955 base year cohort) when several variables are controlled. The main findings are as follows:

(1) The changes in coverage across male cohorts were not large. However, among women, the coverage rate increased rapidly between the oldest and, on the other hand, the second-oldest as well as the third-oldest cohorts. These results are consistent with the previously reported finding that pension reforms have had a significantly positive impact on women's pension coverage.

(2) Interestingly, pensions tended to be higher for the oldest cohort in a given year. This can be attributed, at least partly, to the differential mortality among older people.

(3) Gender differences in a given birth cohort tend to increase with age. However, a comparison of different birth cohorts at a given age revealed that the gender differences in the younger age categories were smaller than those in the older age categories.

<Insert Table 6 here>

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Table 7 and Figures 3 and 4 present the following results:

(1) The pension coverage gender gap decreased sharply, mainly owing to the rapid increase in women's pension coverage (Figures 3 and 4). This reflects an increase in the proportion of younger women becoming eligible for pensions during their working years. There was a sharp decline in the pension coverage gender gap in the cohort born before 1932 (Figure 3). However, the main reason for this decline was not the UEP reform. It was due to other policies implemented in the early periods of the founding of the People's Republic of China. These reforms improved women's social status and increased the number of women working in the public sector.[24] These women gradually retired after 1970 (female workers retired at the age of 50, while female cadres retired at the age of 55). Consequently, the cohort effect changed from significantly negative to zero (Figure 4).

(2) There was no statistically significant birth cohort effect of the 1997 UEP reform on the gender pension coverage gap. Thus, this reform did not increase the labor pension coverage of female workers more than that of male workers.[25]

(3) The 2009 RSP and 2010 UEP reforms significantly decreased the gender gap in pension coverage. The reforms eliminated the pre-existing cohort effects on the

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[24] We calculated the cohort effects of the proportion of public sector workers among women in a similar manner to the calculation in Equation (9). The results showed that the proportion of public sector workers among women increased sharply over time for those born before 1932. There was no similar cohort effect for the proportion of public sector workers among men. Moreover, we calculated the cohort effects on the pension coverage gender gap for two subgroups: (1) Older adults who worked in the public sector before retirement and (2) older adults who did not work in the public sector before retirement), and found no sign of cohort effects for people born before 1932. These results indicate that the main reason for the cohort effect for people born before 1932 is the increasing proportion of public sector workers among women.

[25] There are several potential reasons for this. First, dating back to the 1950s, public sector pensioners have always been legally entitled to pensions. The 1997 reforms, which focused on improving funding and expenditure rules, had little impact on coverage for public sector employees. Second, since the 1980s, China's private economy has grown gradually. The 1997 reform also encouraged private sector employees to participate in the UEP (see Table 1). Since more women are employed in the private sector than in the state sector, the participation of private sector employees in the UEP would narrow the gender coverage gap. However, available evidence indicates that private sector employees were less willing to join the UEP before the early 2000s compared to later. Third, the wave of layoffs caused by SOE reform during the second half of the 1990s had a substantially negative impact on women's employment, which offset some of the positive effects of the 1997 pension reforms.

gender pension coverage gap. The data showed that, before 2009, retired older women had significantly lower pension coverage than men. However, this difference was not observed in 2009.[26]

(4) The cohort effect of the pension benefit gender gap decreased for the 1930–1940 birth cohort, and a complex trend was observed among those born after 1940 (Figure 3). A possible explanation for this decrease is that, according to the CHIP data analysis, the proportion of women working in the public sector among all women in the 1930–1936 birth cohort was still increasing (while that of men in the same birth cohort remained unchanged).

(5) The unified UEP program established in 1997 was beneficial for pensioners (men born after 1940, women cadres born after 1943, and women workers born after 1947).[27]

(6) The time effect of the pension coverage gender gap increased between 1988 and 2002 and decreased between 2002 and 2018. This was because, after controlling for cohort factors, the UEP pilots from 1986 to 1997 increased pension coverage for men more than for women. Furthermore, the UEP pilots provided coverage for more men in the private sector.[28]

(7) The establishment of the RSP in 2009 and the UEP reform in 2010 contributed to the narrowing of the pension coverage gender gap.[29]

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[26] There were significant birth cohort effects on the pension coverage gender gap when using data for 1988–2002. This is similar to what is shown in Figures 3 and 4. However, the birth cohort effects of the pension coverage gender gap estimated using data for 2013–2018 were not significant.

[27] Since the RSP was established after 2009, we cannot directly observe whether there is a birth cohort effect from the UEP on the pension benefit gender gap for people born after 1949.

[28] See the results regarding the pension coverage gender gap for the private sector subgroup in Table 7.

[29] According to the results regarding the pension coverage gender gap of the public sector subgroup in Table 7, the 2010 UEP reform allowed a larger number of retired women who had been employed in the informal sector to be covered by this scheme, helping narrow the gender pension gap in 2013 and 2018. According to the results, the pension coverage gender gap in the private sector decreased rapidly from 2002 to 2013 (Table 7). This represents the significant impact of the establishment of the RSP in 2009.

(8) An examination of the time effect of the pension benefit gender gap revealed no significant change during the 1988–1995 period but a significant increase after 1995. This could be attributed to the increasing participation of males in the fast-growing UEP. This finding is consistent with the trend of the increasing gender contribution gap. In terms of what this indicates for future developments of the gender pension gap, Table 7 shows no significant increase within the public- or private-sector subgroups; therefore, the gender gap is widening between the public and private sectors. Note that, according to CHIP data, the average wage growth rate of public sector workers (8.7%) during the period 1995–2018 was higher than that of private sector workers (7.2%). In the future, this widening pay gap between public and private workers may continue to increase the pension gender gap.

<Insert Table 7, Figure 3, and Figure 4 here>

IX. Conclusions

As mentioned earlier, the pension amount in urban China is determined based on previous wages, and the gender pay gap increased during the period studied here (i.e., 1988–2018). Thus, the Average Gender Pension Gap (AGPG) would also be expected to have increased during the same period. However, our analysis of CHIP data showed otherwise. The AGPG in urban China was much smaller in 2018 than in 1988 and is nowadays of similar magnitude to what can be observed in contemporary developed countries.

The decrease in the AGPG in urban China can be attributed to the fact that, in 1988, many older women did not receive a pension, a situation that changed as a consequence of several pension reforms. Government policies in the 1950s and 1960s allowed women to obtain formal work

status. Subsequently, these women retired between the 1970s and the early 1990s. Furthermore, the data indicates a significant birth cohort effect on the proportion of women working in the public sector. This implies that the number of women born after 1932 and employed in the public sector was significantly higher than those born earlier.

The second round of important pension reforms was the establishment of the RSP in 2009 and improvements to the UEP in 2010. These reforms provided better pension coverage to non-public sector workers and older informal public sector employees. These categories consisted mainly of women. However, on average, men benefited more from the UEP reforms in the 1990s than women. Before the establishment of the Resident Social Pension (RSP), pension coverage and benefits increased more rapidly for men than for women.

Although there is solid evidence regarding the increased gender disadvantages for women in the labor market in urban China since the mid-1990s, the opposite is true when it comes to the gender pension gap among older adults. When discussing the evolution of gender inequality in China's urban areas, we believe that the latter topic has been largely ignored. Although our study is not the first to examine the gender pension gap in urban China, our findings regarding its evolution are novel and worthy of attention when discussing the transformation of gender inequality in urban China.

In particular, the findings discussed in the literature review indicate that income inequality among older adults in urban China is increasing, a development that can be attributed to the pension system. However, it should be noted that the decrease in the gender pension gap is most likely specific to our study period (1988–2018). Our analysis indicates that once the majority of women, like the majority of men, in urban China are eligible to receive pensions,

the gender pension gap will increase. Additionally, the policy change in January 2016 that allowed most urban couples to have two children may also cause some younger women to leave the labor force for longer periods, thereby affecting their future pensions negatively.

As an increasing number of women receive the RSP instead of the UEP, the disparity between the two pension types will exacerbate the gender pension gap. In this context, the primary issue is that the annual growth rate of UEP benefits exceeds that of RSP benefits. However, the financial pressure on local governments and the large number of RSP recipients make it extremely difficult to increase their benefits. Thus, improving China's pension system poses a significant challenge.

Moreover, from a dynamic perspective, our study explains how the emerging multi-track pension system has affected pension income in urban China based on birth cohort and gender. The three conclusions are as follows. First, the pension coverage rate for older women in the early days of the reforms and the opening up was low. Second, the enhanced social status of women and pension reforms in China have reduced this gender inequality over the past few decades. However, as pension coverage for men and women equalizes, the gender pension gap will start increasing. Third, future studies on pension inequality and trends should, like this study, focus on the population coverage of the pension system rather than limiting their analysis to typical recipients.

Finally, there are several issues related to the gender pension gap in China that were beyond the scope of this study but should be explored in future research. Additionally, we did not address the reasons why pension coverage among women increased during most of the study period. Our study focused on the income received by older individuals, excluding any broader

considerations regarding gender differences in their well-being.[30] It should also be noted that many older adults in urban China live in the same household with other adults, typically their children, and that we did not explore issues related to such cohabitation or its consequences, such as the economic well-being of the older adult population.

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[30] For an example of such a study, see Chen et al. (2021).

References

Bettio, Francesca, Platon Tinios, and Gianni Betti. 2013. "The Gender Gap in Pensions in the EU." European Network of Experts on Gender Equality, Fondazione Giacomo Brodolini. https://imagenes.publico.es/resources/archivos/2013/6/3/1370241549282Informe%20Comision%20Europea.pdf

Chen, Mengni, Yuanyuan Fu, and Qingsong Chang. 2021. "Life Satisfaction among Older Adults in Urban China: Does Gender Interact with Pensions, Social Support and Self-care Ability." *Ageing and Society* 42(9): 2026-2045.

Chen, Tianhong, and John Turner. 2015. "Gender and Public Pensions in China: Do Pensions Reduce the Gender Gap in Compensation?" *Sustainability* 7(2): 1355-1369.

Fang, Hanming, and Jin Feng. 2018. "The Chinese Pension System." *NBER working paper No. 25088*. https://ideas.repec.org/p/nbr/nberwo/25088.html

Feng, Shuaizhang, Yingyao Hu, and Robert Moffitt. 2017. "Long Run Trends in Unemployment and Labor Force Participation in Urban China." *Journal of Comparative Economics* 45(2): 304-324.

Giles, John, Xiaoyan Lei, Gewei Wang, Yafeng Wang, and Yaohui Zhao. 2021. "One Country, Two Systems: Evidence on Retirement Patterns in China." *Journal of Pension Economics & Finance* 22(2): 188-210.

Gustafsson, Bjorn, and Shi Li. 2000. "Economic Transformation and the Gender Earnings Gap in Urban China." *Journal of Population Economics* 13: 305-329.

Hanewald, Katja, Ruo Jia, and Zining Liu. 2021. "Why is Inequality Higher Among the Old? Evidence from China." *China Economic Review* 66: 101592.

Hare, Denise. 2016. "What Accounts for the Decline in Labor Force Participation among Married Women in Urban China, 1991–2011." *China Economic Review* 38: 251-266.

Iwasaki, Ichiro, and Xinxin Ma. 2020. "Gender Wage Gap in China: A Large Meta-Analysis." *Journal for Labour Market Research* 54(1): 1-19.

Jia, Hanrui, Peng Zhan, and Shi Li. 2021. "The Income Inequality in Multi-Track Pension System: Findings based on CHIP Data." *Public Finance Research* (in Chinese) 3: 101-114.

Li, Jinjing, Xinmei Wang, Jing Xu, and Chang Yuan. 2020. "The Role of Public Pensions in Income Inequality among Elderly Households in China 1988-2013." *China Economic Review* 61(6): 101422.

Li, Shi, and Chunbing Xing. 2016. *The Economic Situation Analysis of Rural-Urban and Urban-Urban Migration*. Beijing: China Workers Publishing House. (in Chinese)

Ohtake, Fumio, and Makoto Saito. 1998. "Population Aging and Consumption Inequality in Japan." *Review of Income and Wealth* 44(3): 361-381.

Ponthieux, Sophie, and Dominique Meurs. 2015. "Gender Inequality." In: Atkinson, Anthony B, François Bourguignon (ed), *Handbook of Income Distribution (Volume 2)*, Chapter 12. Amsterdam: Elsevier, pp 981-1146.

Rosenbaum, Paul R, and Donald B Rubin. 1983. "The Central Role of the Propensity Score in Observational Studies for Causal Effects." *Biometrica* 70(1): 41-55.

Shen, Kailin. 2018. *China Social Security*. Beijing: Tsinghua University. (in Chinese)

Sicular, Terry, Hiroshi Sato, Shi Li, and Ximing Yue. 2020. *Changing Trends in China's Inequality: Evidence, Analysis and Prospects*. New York: Oxford University Press.

Wu, Jinlian. 2010. *Understanding and Interpreting China's Economic Reform.* Shanghai: Shanghai Yuandong Press. (in Chinese)

Ye, Bing, and Yucong Zhao. 2018. "Women Hold up Half the Sky? Gender Identity and the Wife's Labor Market Performance in China." *China Economic Review* 47: 116-141.

Zhao, Rui, and Yaohui Zhao. 2018. "The Gender Pension Gap in China." *Feminist Economics* 24(2): 218-239.

Zhao, Yucong, Bing Ye, and Jinchuang Shi. 2022. "Gender Identity, Preference, and Relative Income within Households." *China Economic Review* 71: 101741.

Zhu, Huoyun, and Alan Walker. 2018. "Pension System Reform in China: Who Gets What Pensions?" *Social Policy Administration* 52(7): 1410-1424.

Table 1. Important pension reform events during the past decades.

Year	Main events	A	B	C	D	E	F
1958	Retirement system for workers and staff established.	√	√	/	/	/	/
1986	Contract labor system implemented for workers hired after 1986 in SOEs. New workers pay no more than 3% of the standard salary for pension.		√	/	/	/	/
1986–1997	Various central and local government policies promoted different pilot pension rules in different regions.		√	/	/	/	/
1997	The Urban Employees' Pension Scheme (UEP), a unified basic pension insurance system, was established.		√	/	√	/	/
2003	Part of the residents' lost land was gradually covered by the UEP and is called the "Land Requisition for Pension."			/		√	/
2005	The UEP was extended to individual industrial and commercial households (self-employed) and flexible employees. Since then, these groups can voluntarily join the UEP.			/	√	√	/
2009	The NRRSP was established in rural areas.			/		√	√
2010	Remaining issues regarding basic pension security for uninsured retirees from collective enterprises and SOEs were resolved.			√			
2011	The URSP was established in urban areas.					√	√
2014	The NRRSP and URSP were combined, forming the URRBP.					√	√
2015	Pension system ended for government agency and institution staff who then needed to join the UEP and contribute toward their pensions.	√					

Source: Arranged by authors.

Note: (1) A represents the staff of government agencies and institutions. B represents the formal employees of SOEs and collective enterprises. C denotes the informal employees of SOEs and collective enterprises who have no contracts or only short-term contracts. D represents formal or long-term contract workers in foreign-funded enterprises, joint ventures, and private enterprises. E denotes short-term contract or non-contract workers in foreign companies, joint ventures, and private companies; self-employed workers; and land-lost farmers. F represents people who did not provide their employment information and residents who were not employed.

(2) SOE: state-owned enterprise; UEP: Urban Employees' Pension; URSP: Urban Resident Social Pension; NRRSP: New Rural Resident Social Pension; URRBP: Urban-Rural Resident Basic Pension.

(3) √ = pension reform covers the population group; / = no pension scheme covers the population group.

Table 2. Distribution of working-age and older adults in urban China according to different population segments, % (1988–2018).

	1988	1995	2002	2013	2018
Different population segments aged 16–59 years, %					
/A&B	77.6	75.0	40.8	15.9	18.1
/C	1.5	2.8	6.7	4.6	5.7
/D	1.1	2.1	5.5	7.9	11.4
/E	0.8	5.2	13.8	42.9	40.4
/F	19.0	14.9	33.1	28.8	24.5
Older adults covered by different pension types, %					
/UEP	57.9	75.6	80.9	51.0	59.3
/RSP	0.0	0.0	0.0	27.5	22.5
/OP	0.0	0.0	0.0	1.6	1.3
/NONE	42.1	24.4	19.1	19.8	16.9
Sample size in each year, number of people					
/Men	1,157	1,144	1,051	1,641	1,926
/Women	1,267	1,013	1,040	1,696	2,090

Source: Authors' calculations based on the China Household Income Project data.

Note: (1) Different types of working-aged groups: A&B represent the staff of government agencies and institutions and formal employees of state-owned enterprises and collective enterprises. C denotes informal employees of state-owned enterprises and collective enterprises who do not have contracts or only have short-term contracts. D represents formal or long-term contract workers in foreign-funded enterprises, joint ventures, and private enterprises. E denotes short-term contract or non-contract workers in foreign companies, joint ventures, and private companies; self-employed workers; and land-lost farmers. F represents individuals who have not provided their employment information and residents who were not employed.

(2) UEP: Urban Employees' Pension; RSP: Resident Social Pension; OP: other pensions; NONE: people not covered by any pension.

(3) Information on the proportion of women within each older adult group is provided in the online appendix.

Table 3. Gender pension gap, pension coverage gender gap, and pension benefit gender gap (1988–2018).

	1988	1995	2002	2013	2018
Pension income (average among all people aged 60+ years)					
-Women (yuan in RMB)	1,393	4,227	8,679	13,662	19,962
-Men (yuan in RMB)	3,904	8,256	15,248	20,971	29,276
-Ratio (AGPG)	2.80	1.95	1.76	1.53	1.47
Pension coverage (among all people aged 60+ years)					
-Women	39.8	61.7	70.9	77.4	81.4
-Men	77.6	88.0	91.1	82.9	85.0
-Ratio (APCGG)	1.95	1.43	1.28	1.07	1.04
Pension benefits (among persons receiving pension aged 60+ years)					
-Women (yuan in RMB)	3,501	6,852	12,239	17,655	24,520
-Men (yuan in RMB)	5,029	9,381	16,734	25,294	34,457
-Ratio (APBGG)	1.44	1.37	1.37	1.43	1.41

Source: Authors' calculations based on China Household Income Project data. More results can be found in Appendix 2.

Note: (1) Pensions were measured at the constant 2018 prices.

(2) The index "Ratio" was used to identify the gender pension gap for the decomposition analysis.

(3) AGPG: average gender pension gap; APCGG, average e pension coverage gender gap; APBGG, average pension benefit gender gap.

Table 4. Impact of the UEP and RSP on the Average Gender Pension Gap (AGPG).

		Absolute contribution to changes in AGPG				Relative contribution to changes in AGPG, multiplied by -1, %			
		1988–1995	1995–2002	2002–2013	2013–2018	1988–1995	1995–2002	2002–2013	2013–2018
	Total change	-0.3606	-0.1060	-0.1354	-0.0452	-100.00	-100.00	-100.00	-100.00
	Contributed by								
a	**Benefit changes (b+c+d+e)**	**-0.0481**	**-0.0014**	**0.0468**	**-0.0193**	**-13.34**	**-1.28**	**34.54**	**-42.74**
b	/UEP	-0.0481	-0.0014	-0.1084	0.0317	-13.34	-1.28	-80.06	70.09
c	/RSP	0.0000	0.0000	-0.0297	-0.0101	0.00	0.00	-21.92	-22.42
d	/Proportion of the UEP	0.0000	0.0000	0.2145	-0.0496	0.00	0.00	158.44	-109.69
e	/Proportion of the RSP	0.0000	0.0000	-0.0297	0.0087	0.00	0.00	-21.92	19.28
f	**Coverage changes (g+h)**	**-0.3125**	**-0.1046**	**-0.1821**	**-0.0259**	**-86.66**	**-98.72**	**-134.54**	**-57.26**
g	/UEP	-0.3125	-0.1046	-0.0262	-0.0389	-86.66	-98.72	-19.33	-86.12
h	/RSP	0.0000	0.0000	-0.1559	0.0131	0.00	0.00	-115.21	28.87

Source: Authors' calculations based on the decomposition approach used in this study. Appendix 4 presents detailed results, while Appendix 6 presents the results after cross-sectional and longitudinal matching.

Note: (1) RSP refers to older adults not covered by the UEP but covered by the RSP or other pensions (such as commercial pensions). Some people with commercial pensions may not want to participate in the RSP; hence, we combined other pensions into the RSP. The percentage of other pension types is less than 2% (Table 2) and has a marginal influence on the gender pension gap.

(2) "Benefit changes" only cover pensioners and do not affect those without pensions.

(3) Relative contribution is multiplied by -1; therefore, the negative values correspond to reducing the gender gap and positive values to increasing the gender gap.

(4) AGPG: average gender pension gap; UEP: Urban Employees' Pension; RSP: Resident Social Pension; OP: other pensions; NONE: people not covered by any pension.

Table 5. Coverage and benefits of different pension types for older adults (1988–2018).

	Coverage of each pension, %					Pension benefits of each pension, yuan in RMB				
	1988	1995	2002	2013	2018	1988	1995	2002	2013	2018
All urban older adults										
UEP	57.9	75.6	80.9	51.0	59.3	4,479	8,412	14,747	30,768	39,296
RSP	0.0	0.0	0.0	27.5	22.5	/	/	/	5,299	4,692
OP	0.0	0.0	0.0	1.6	1.3	/	/	/	4,799	5,231
NONE	42.1	24.4	19.1	19.8	16.9	0	0	0	0	0
Older urban men										
UEP	77.6	88.0	91.1	57.7	64.8	5,029	9,381	16,734	33,773	43,659
RSP	0.0	0.0	0.0	23.6	19.2	/	/	/	5,959	4,943
OP	0.0	0.0	0.0	1.6	1.0	/	/	/	5,194	3,202
NONE	22.4	12.0	8.9	17.1	15.0	0	0	0	0	0
Older urban women										
UEP	39.8	61.7	70.9	44.7	54.2	3501	6,852	12,239	27,049	34,511
RSP	0.0	0.0	0.0	31.2	25.5	/	/	/	4,820	4,519
OP	0.0	0.0	0.0	1.6	1.7	/	/	/	4,422	6,289
NONE	60.2	38.3	29.1	22.5	18.6	0	0	0	0	0

Source: Authors' calculation based on China Household Income Project data.

Note: (1) UEP: Urban Employees' Pension; RSP: Resident Social Pension; OP: other pensions; NONE: people not covered by any pension.

(2) More results are presented in Appendix 7.

Table 6. Pension coverage gender gap, pension benefit gender gap and gender pension gap for different birth cohorts (1988–2018).

Birth year	Calendar years when 60 years of age	Pension Coverage Gender Gap					Pension Benefit Gender Gap					Gender Pension Gap				
		1988	1995	2002	2013	2018	1988	1995	2002	2013	2018	1988	1995	2002	2013	2018
1915–1921	1975–1981	2.26	2.63				1.44	1.21				3.26	3.17			
1922–1928	1982–1988	1.24	1.68	1.62	1.29		1.48	1.49	1.57	2.31		1.83	2.50	2.54	2.99	
1929–1935	1989–1995		1.10	1.28	1.16	1.27		1.34	1.39	1.85	1.80		1.48	1.78	2.15	2.28
1936–1942	1996–2002			1.09	1.10	1.06			1.28	1.33	1.51			1.40	1.47	1.60
1943–1947	2003–2007				1.11	1.09				1.30	1.34				1.44	1.47
1948–1953	2008–2013				1.00	1.06				1.37	1.41				1.37	1.49
1954–1958	2014–2018					0.98					1.30					1.27

Source: Authors' calculation based on China Household Income Project data.

Note: The sample size for each birth cohort was required to contain at least 30 observations.

Table 7. Time effects of gender differences in pension coverage and pension benefits in urban China.

	Pension Coverage			Pension Benefits		
	All	Public	Private	All	Public	Private
Man × Survey Years						
1988	(base)	/	/	(base)	/	/
1995	0.199***	(base)	(base)	-0.145	(base)	(base)
	(0.036)	/	/	(0.154)	/	/
2002	0.233***	0.002	0.083	0.015	0.032	0.247
	(0.038)	(0.015)	(0.076)	(0.158)	(0.049)	(0.356)
2013	0.123***	-0.026	-0.230***	0.354**	-0.079	0.677**
	(0.04)	(0.017)	(0.071)	(0.166)	(0.058)	(0.292)
2018	0.098**	-0.045**	-0.254***	0.402**	0.011	0.471
	(0.042)	(0.018)	(0.073)	(0.17)	(0.061)	(0.299)
Gender	Yes	Yes	Yes	Yes	Yes	Yes
Survey year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Birth year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Education levels	Yes	Yes	Yes	Yes	Yes	Yes
Provinces	Yes	Yes	Yes	Yes	Yes	Yes
Obs	12,044	5,784	4,124	9,445	5,644	2,572
Adj-R^2	0.2545	0.0222	0.2202	0.3632	0.7428	0.1808

Source: Authors' calculations based on China Household Income Project data. The time effect of gender gap was $\hat{\beta}_{4,j}$ in Equation (10).

Note: *$p \leq 0.10$, **$p \leq 0.05$, ***$p \leq 0.01$.

Fig. 1. Relationships between four types of pension systems and six population categories.

Source: Arranged by authors.

Note: UEP, Urban Employees' Pension; RSP, Resident Social Pension; PEP, Public Employee Pension; UEBP, Urban Employee Basic Pension; NRRSP, New Rural Resident Social Pension; URRBP, Urban–Rural Resident Basic Pension; URSP, Urban Resident Social Pension; SOEs, stated owned enterprises.
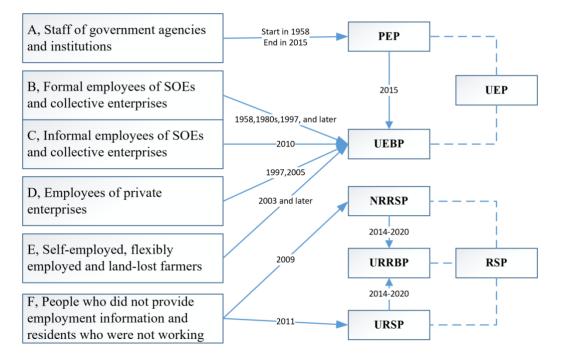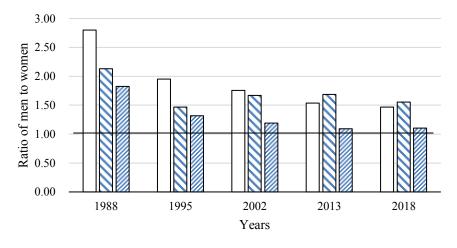
Fig. 2. Gender pension gaps in 1988, 1995, 2002, 2013, and 2018 using three definitions.

Source: Authors' calculation based on China Household Income Project data.

Note: AGPG: aggregate gender pension gaps in the population aged 60+ years; GPGC: gender pension gap for couples aged 60+ years (only household heads and their spouses); GPGCS: gender pension gap in the population aged 60+ years if couples' pensions are shared. The relevant calculations are shown in Equations (1), (4), and (5).

Fig. 3. Cohort effect of the pension coverage gender gap and pension benefit gender gap in urban China.

Source: Authors' calculations based on China Household Income Project data. The cohort effect was $\hat{\beta}_{5,p}$ in Equation (10).

Note: The base year of the cohort effect is 2015. The dotted line is the 95% confidence interval. On the left side of figure, "Birth" means the year of birth, "50" means the calendar year when 50 years of age, "55" means the calendar year when 55 years of age, and "60" means the calendar year when 60 years of age. The label of x axis is the estimated coefficient of $\hat{\beta}_{5,p}$ in Equation (10).
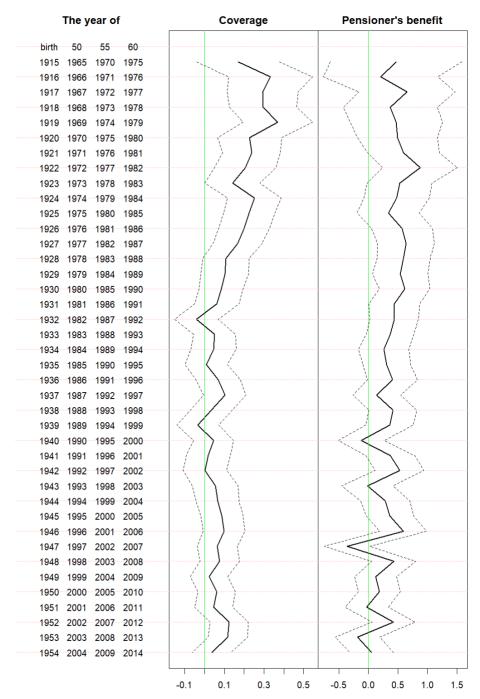
Fig. 4. Cohort effect of the pension coverage and benefits in urban China.

Source: Authors' calculations based on China Household Income Project data. The cohort effect was $\hat{\beta}_{2,p}$ in Equation (9).

Note: The base year of the cohort effect is 2015. The dotted line is the 95% confidence interval. At the left side of figure, "Birth" means the year of birth, "50" means the calendar year when 50 years of age, "55" means the calendar year when 55 years of age, and "60" means the calendar year when 60 years of age. The label of x axis is the estimated coefficient of $\hat{\beta}_{2,p}$ in Equation (9).

(a) Men

(b) Women