ORIGINAL RESEARCH ARTICLE

Economic insecurity and suicide vulnerability among women in China

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Abstract

This study examines the relationship between multidimensional economic insecurity, structural socioeconomic change, and female suicide vulnerability in China. The analysis employs a qualitative secondary-data approach using annual national time-series data for China covering 2000–2024, sourced from the World Health Organization Mortality Database, World Bank World Development Indicators, and International Labour Organization labour statistics. Descriptive trend and comparative analyses supported by graphical visualisation techniques were used to examine patterns and associations among the variables. The findings reveal a substantial long-run decline in the female suicide rate from 15.18 per 100,000 women in 2000 to 8.69 in 2024, although a mild increase was observed after 2020. Labour market indicators evolved unevenly: vulnerable employment declined markedly, wage employment increased, labour force participation fell gradually, and unemployment fluctuated within a narrow range. Among the indicators examined, vulnerable employment showed the strongest alignment with female suicide vulnerability, whereas unemployment displayed a weaker relationship. This study advances a gender-sensitive and multidimensional framework linking suicide vulnerability to labour market insecurity, employment structure, inequality, and demographic transformation, with implications for public health and labour policy. *(Afr J Reprod Health 2026; 30 [14]: 121-139).*

Keywords: Economic insecurity; Female suicide vulnerability; Labour market inequality; Structural transformation

Résumé

Cette étude examine la relation entre l'insécurité économique multidimensionnelle, les mutations socio-économiques structurelles et la vulnérabilité au suicide chez les femmes en Chine. L'analyse repose sur une approche qualitative exploitant des données secondaires — des séries chronologiques nationales annuelles pour la Chine couvrant la période 2000-2024, issues de la base de données sur la mortalité de l'Organisation mondiale de la Santé, des indicateurs du développement dans le monde de la Banque mondiale et des statistiques du travail de l'Organisation internationale du Travail. Des analyses descriptives des tendances et des comparaisons, appuyées par des techniques de visualisation graphique, ont permis d'étudier les schémas et les associations entre les variables. Les résultats révèlent une baisse substantielle à long terme du taux de suicide féminin, passant de 15,18 pour 100 000 femmes en 2000 à 8,69 en 2024, bien qu'une légère hausse ait été observée après 2020. Les indicateurs du marché du travail ont évolué de manière contrastée : l'emploi vulnérable a nettement reculé, l'emploi salarié a progressé, le taux d'activité a diminué graduellement et le chômage a fluctué dans une fourchette restreinte. Parmi les indicateurs examinés, l'emploi vulnérable présentait la corrélation la plus marquée avec la vulnérabilité au suicide féminin, tandis que le chômage affichait un lien plus faible. Cette étude propose un cadre d'analyse multidimensionnel et sensible à la dimension de genre, reliant la vulnérabilité au suicide à l'insécurité sur le marché du travail, à la structure de l'emploi, aux inégalités et aux mutations démographiques, avec des implications pour les politiques de santé publique et de l'emploi. *(Afr J Reprod Health 2026; 30 [14]: 121-139).*

Mots-clés: Insécurité économique ; Vulnérabilité des femmes au suicide ; Inégalités sur le marché du travail ; Transformation structurelle

Introduction

Suicide remains one of the most pressing and preventable public health challenges worldwide. Recent global estimates indicate that more than 700,000 individuals die by suicide each year, creating a significant burden on health systems and society (WHO[1]). Although suicide mortality is generally higher among men, patterns of suicide among women vary considerably across regions,

challenging traditional assumptions in suicide research[2,3,4.] These variations suggest that female suicide vulnerability cannot be explained solely through psychiatric perspectives but must also be examined within broader socioeconomic environments that shape women lived experiences. Evidence from developing and transitional economies increasingly highlights the socioeconomic roots of female-suicide vulnerability. In several Asian countries, the gender gap in suicide mortality has historically been narrower than that observed in high-income nations, and in some contexts, female suicide rates have even exceeded those of men.[6,1] Studies from India indicate that women under the age of 30 sometimes experience higher suicide rates than men, with financial stress and low socioeconomic status emerging as major risk factors.[7]

Farming-related stress contributes to rising suicide vulnerability in rural communities, where indebtedness, unstable agricultural income, and financial insecurity intensify psychological stress[8]. These findings support the view that female suicide vulnerability reflects the interaction between psychosocial pressures and structural inequalities embedded within economic systems.[9]

China provides an important context for examining these dynamics in several ways. Historically, the country has displayed one of the most unusual suicide patterns globally. During the late twentieth century, female suicide rates in China were among the highest worldwide, and in some rural areas, they even exceeded those of men[10]. This pattern has attracted significant scholarly attention because it contradicts the global trend of higher male suicide mortality. However, over the past three decades, China has recorded a remarkable decline in suicide mortality. Scholars attribute this reduction largely to rapid economic development, improved living standards, expanded healthcare services, and accelerated urbanisation.[11,1]

However, disparities persist. Earlier studies documented higher suicide vulnerability in rural areas due to social isolation, restricted access to healthcare, and the availability of lethal means such as pesticides[10,12,13,14]. Although the rural-urban gap has narrowed, structural inequalities continue to influence suicide vulnerability across population groups.[15-17]

Therefore, economic insecurity has emerged as a key concept for understanding the structural influences on mental health. It refers broadly to uncertainty regarding employment stability, income continuity, and access to financial resources.[18] In contemporary labour markets shaped by globalisation, technological change, and economic restructuring, such insecurities have become increasingly prevalent. Women are often disproportionately exposed to these risks due to gendered labour market inequality. Across many economies, female workers are more likely to be engaged in precarious employment, such as informal work, temporary contracts, or part-time jobs that provide limited income stability and weaker social protection.[3,19] Persistent gender wage gaps further reduce women's economic autonomy and increase their dependence on household income during periods of financial instability.[20]

China's economic transformation illustrates these dynamics well. Market-oriented reforms introduced in the late twentieth century restructured the labour markets, reducing employment guarantees previously associated with the socialist system and increasing competition within the private sector[21]. While these reforms stimulated economic growth and expanded employment opportunities, they also introduced new forms of labour market insecurity. Women have been disproportionately affected by layoffs during the restructuring of state-owned enterprises and continue to face occupational segregation in emerging labour markets[21]. Rapid urbanisation and rural-to-urban migration have also transformed employment patterns, with many migrant women working in the manufacturing and service sectors, which often provide limited job security and social protection.[22]

Several theoretical perspectives help explain how economic insecurity may translate into suicide vulnerability. Strain theory suggests that psychological distress arises when individuals face barriers that prevent them from achieving socially valued goals, such as stable employment or economic advancement.[23] Similarly, the social determinants of health framework emphasises that health outcomes are strongly shaped by broader socioeconomic conditions, including employment, income, and access to healthcare.[24] Gender inequality theory further highlights how structural

disparities in labour market participation and economic independence expose women to unique socioeconomic pressures that may affect mental wellbeing.[25]

Empirical research supports these theoretical perspectives. Cross-national studies have shown that unemployment and economic downturns are associated with increased suicide mortality.[26] For example, the global financial crisis of 2008 was followed by noticeable increases in suicide rates among populations affected by job loss and financial distress.[27] Evidence from China also highlights the socioeconomic dimensions of suicide vulnerability, linking earlier suicide patterns to rural poverty and limited healthcare access, while associating recent declines with improvements in economic conditions and public health infrastructure.[10,11]

Broader public health research has further demonstrated that socioeconomic conditions strongly influence health outcomes and well-being. Public health expenditure, healthcare financing systems, and domestic resource mobilisation contribute to reducing mortality and improving health outcome.[28-30] Women's socioeconomic status and household wealth also affect access to maternal healthcare services, such as antenatal care and institutional delivery.[31]

The general objective of this study is to examine how multidimensional economic insecurity and structural socioeconomic change relate to female suicide vulnerability in China. Specifically, this study seeks to:

Obj 1: Analyse the temporal evolution of female suicide vulnerability in China;

Obj 2: Examine the dynamics of gendered labour market insecurity, including female unemployment, vulnerable employment, wage employment, and labour force participation.

Obj 3: investigate the relationship between female suicide vulnerability and key indicators of economic insecurity; and

Obj 3: Assess how broader structural socioeconomic factors, including income inequality and urban–rural population transformation, coincide with changes in female suicide vulnerability.

Methods

This study adopts a qualitative analytical approach based on secondary data to examine the relationship between economic insecurity and suicide vulnerability among Chinese women. The methodological strategy was designed to interpret socioeconomic patterns using descriptive interpretation supported by empirical indicators drawn from established international databases. Rather than estimating causal econometric relationships, the analysis focuses on identifying observable trends, associations, and distributions among key variables identified in the literature.

A qualitative secondary data approach is particularly appropriate for this study for several reasons: First, the research problem involves examining the structural relationships between socioeconomic conditions and public health outcomes over a long period. Such relationships are best explored through the interpretation of existing national and international datasets that capture demographic, labour market, and inequality-related indicators. Second, suicide mortality and labour market indicators are routinely collected by international organisations and national statistical agencies, making secondary data analysis a reliable and efficient method. Third, this approach enables the integration of multiple indicators of economic insecurity, thereby providing a broader understanding of the structural conditions affecting women's vulnerability to suicide.

Data sources

This study relied exclusively on secondary data obtained from internationally recognised statistical repositories and institutional databases. The primary sources include the World Health Organization (WHO) mortality database38, the World Bank World Development Indicators[40], and labour market statistics compiled by the International Labour Organization (ILO).[39,41,42]

These databases provide reliable and internationally comparable indicators of suicide mortality, labour market conditions, and socioeconomic inequality.

The datasets used in this study cover the period from 2000 to 2025, allowing the analysis to capture long-term socioeconomic transformations and their potential implications for suicide vulnerability among women in China.

The selection of these datasets was guided by three criteria. First, the datasets must provide gender-disaggregated indicators relevant to research objectives. Second, the data must be publicly accessible and widely used in academic research to ensure transparency and replicability of the results. Third, the indicators must capture the different dimensions of economic insecurity and social inequality.

International databases, such as those produced by the WHO, ILO, and World Bank, are widely recognised for their methodological reliability and standardised data collection procedures. These institutions compile statistics based on nationally reported data and internationally harmonised methodologies, which enhance the credibility and comparability of the indicators used in this study.

Variable description and source

This section describes the variables employed in this study and the data sources from which they were obtained. Consistent with the conceptual framework, the variables were selected to capture the multidimensional nature of economic insecurity and its potential association with female suicide rates. The analysis uses annual data covering the period 2000–2024, which allows the study to examine long-term trends in female suicide vulnerability alongside changes in labour market conditions and broader socioeconomic structures in China.

The dependent variable is female suicide vulnerability, measured using the female suicide mortality rate per 100,000 female populations. The explanatory variables represent the key dimensions of economic insecurity and structural socioeconomic conditions, including female unemployment, vulnerable employment among women, female labour force participation, and income inequality. These indicators capture different aspects of economic insecurity, such as labour market exclusion, employment instability, economic participation, and the distribution of economic resources within society.

Data were obtained from internationally recognised and widely used statistical sources to ensure reliability and comparability over time. Specifically, suicide mortality data were sourced from the World Health Organization Mortality Database, while labour market indicators were obtained from the International Labour Organization (ILO) and the World Bank. Income inequality data, measured using the Gini index, were sourced from the World Bank. Table 1 presents the operationalisation of the study variables, including their conceptual definitions, measurement indicators and corresponding data sources.

Data processing and management

The secondary data used in this study were extracted from relevant institutional databases and organised into a structured dataset covering the study period. The data extraction process involved compiling the annual values for each variable from the selected sources. Following extraction, the data were reviewed to identify missing values, inconsistencies and formatting issues. Data cleaning involved correcting formatting errors, ensuring consistent measurement units, and aligning the variables across years.

Missing values were computed using interpolation and extrapolation, where necessary, to preserve the integrity of the dataset and avoid artificial distortion of the original data. The cleaned dataset was subsequently organised into a chronological structure to facilitate time-series interpretation. Variables were classified into dependent, independent, and contextual categories based on the conceptual framework. The organised dataset was then prepared for descriptive analysis and visual representation using tables and graphical tools.

Ethical considerations

This study relied exclusively on publicly available secondary datasets and therefore did not involve human or animal participants; thus, ethical approval was not required.

Table 1: Variable description, measurement and sources

Variable Name	Description	Measurement	Data Source
Female Suicide Rate	Vulnerability of women to suicide mortality	Suicide mortality rate among women (per 100,000 female population)	WHO Mortality Database
Female Unemployment	Labour market exclusion among women	Unemployment rate among women (% of female labour force)	ILO / World Bank
Vulnerable Employment (Female)	Employment characterised by instability and limited social protection	Vulnerable employment as a percentage of female employment	ILO
Female Labour Force Participation	Women's engagement in economic activity	Female labour force participation rate (% of women aged 15+)	World Bank WDI
Income Inequality	Unequal distribution of income within society	Gini Index	World Bank WDI
Urban Population	Proportion of the total population residing in urban areas characterised by higher population density and greater concentration of economic and social infrastructure.	Percentage of the total population living in urban areas (% of the total population).	World Bank WDI
Rural Population	Proportion of the total population residing in rural areas, typically characterised by lower population density and greater reliance on agricultural or primary sector activities.	Percentage of the total population living in rural areas (% of total population).	World Bank WDI
Female Wage Employment	Proportion of employed women engaged in wage and salaried work, typically associated with more stable income, formal contracts, and better labour protections.	Percentage of women employed in wage and salaried positions (% of total female employment).	World Bank WDI

Source: authors compilation

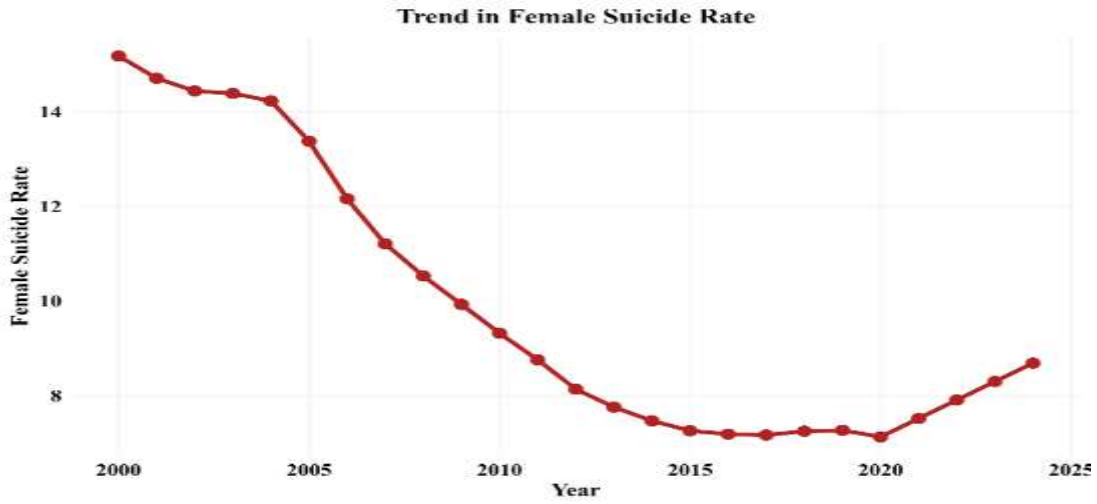
Results

This section presents the empirical results through a graphical exploration of annual secondary data for China covering 2000 to 2024. The analysis focuses on female suicide vulnerability and its relationship with labour market conditions, income inequality, and broader structural socioeconomic transformations. The graphical approach is used to display observable trends, co-movements, directional shifts, and distributional patterns across the study period before substantive interpretation is undertaken in the Discussion section.

The presentation is organised into four broad components. First, this section reports the trends in female suicide vulnerability. Second, it presents the labour market indicators used to capture economic insecurity, namely female unemployment, vulnerable employment and female labour force participation. Third, it reports combined indicator graphs, including the raw combined trend, standardised comparison graph, and dual-axis plot. Fourth, it presents structural graphs of employment composition and wider socioeconomic changes, followed by scatter plots that display the visual association between female suicide and selected labour market indicators.

Trend in female suicide vulnerability

Figure 1 shows a pronounced long-run decline in the female suicide rate in China over the period of review. The rate fell from 15.2 per 100,000 women in 2000 to 8.7 in 2024, representing an absolute decline of 6.49 points and an overall reduction of approximately 42.8 %. The trajectory is not uniform across the full sample, but the dominant pattern is a downward trend. The steepest phase of decline



Source: Authors' illustration using world bank data

Figure 1: Female suicide rate trend in China

appears to be between 2000 and 2012, when the female suicide rate dropped from 15.2 to 8.1. The decline continued thereafter, although at a slower pace, with the series reaching 7.1 in 2020, which is the lowest value recorded in the dataset. From 2021 onwards, however, the graph shows a modest reversal, as the rate rises from 7.5 in 2021 to 8.7 in 2024. Thus, the graph presents two broad phases: an extended period of decline from 2000 to 2020, followed by a mild upward movement in the closing years of the sample period.

The series also suggests that fluctuations became narrower in the later years. While the early 2000s were characterised by relatively high levels and larger annual reductions, the post-2015 period shows greater stability, with values clustered between 7.1 and 8.7. Overall, the graph indicates a substantial long-term reduction in female suicide vulnerability, albeit with some recent upward movement after 2020.

Labour market indicators of economic insecurity

Figure 2 presents the time-series behaviour of the female unemployment rate. In contrast to the suicide series, female unemployment does not consistently rise or fall. Instead, it displayed a mildly upward but fluctuating trajectory over the study period. The unemployment rate increased from 2.8 % in 2000 to 4% in 2024, corresponding to an absolute increase of 1.2 percentage points, or approximately 41.0 % relative to the initial value.

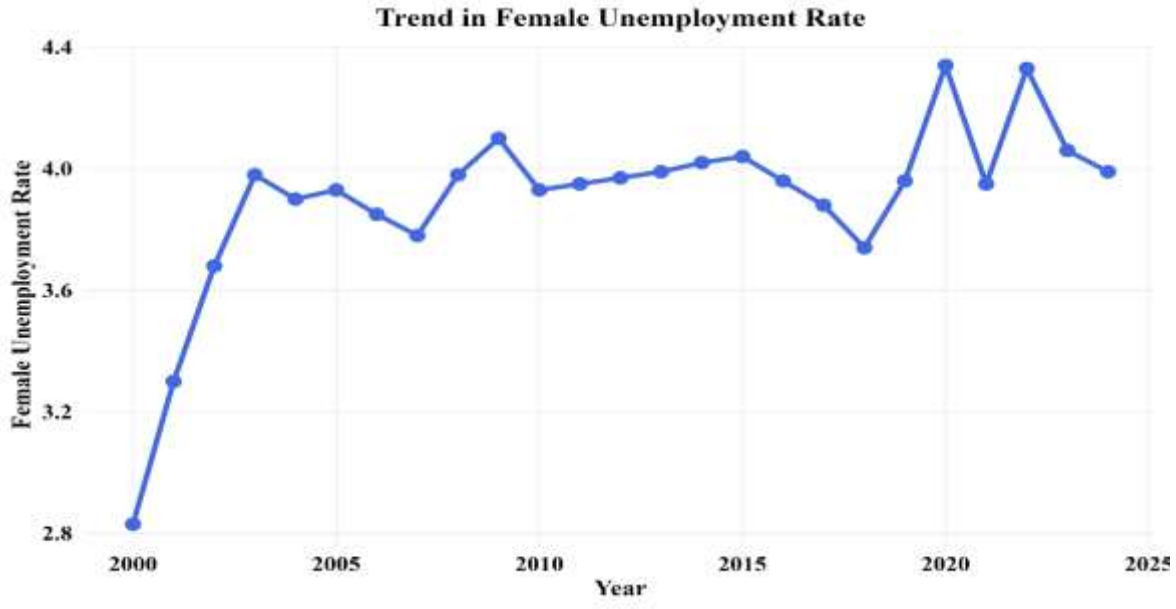
The graph shows that unemployment rose quite steadily in the early years, increasing from 2.8 % in 2000 to 4% in 2003. It then remained relatively stable in the 3.8 to 4.1 % range for much of the 2004 to 2019 period. The highest rate in the series is observed in 2020 at 4.3%, after which the graph indicates continued fluctuation, including 4.3% in 2022, before easing slightly to 4% in 2024.

Overall, Figure 2 shows that female unemployment in China remained comparatively moderate in absolute terms, but it also reveals the absence of sustained downward improvement. Rather, the pattern is one of a gradual increase combined with short-run oscillations.

Female vulnerable employment trend

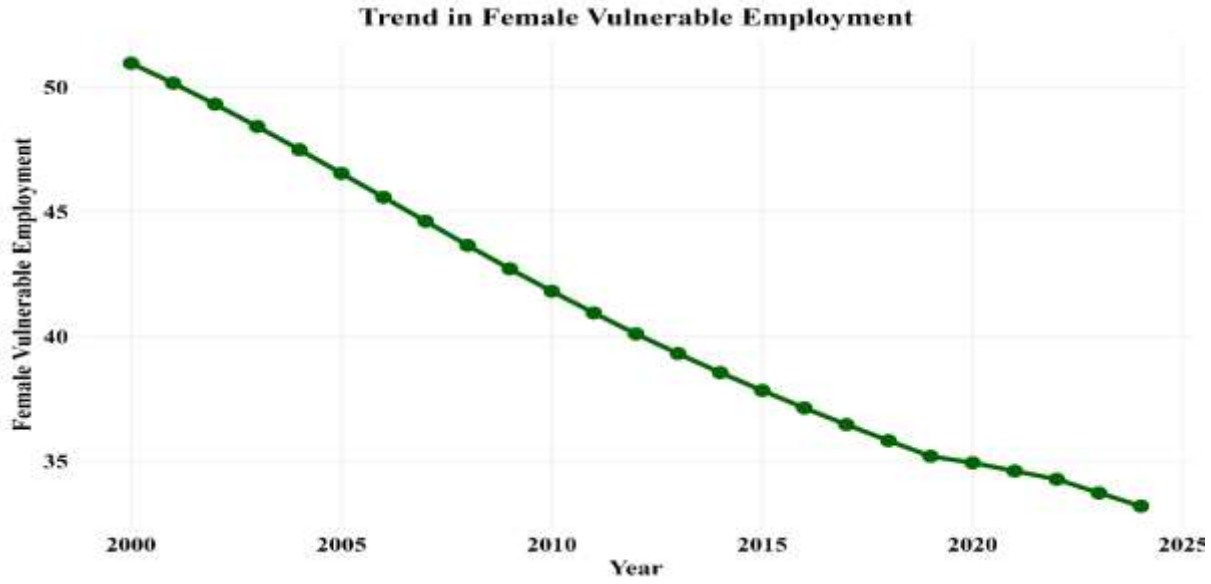
Figure 3 shows a clear and persistent decline in female vulnerable employment across the period under study. The indicator decreased from 51% in 2000 to 33.2 % in 2024, giving an absolute reduction of 17.8 percentage points and a relative decline of approximately 35%. This is one of the most consistent trends observed in the dataset.

The graph reveals an almost monotonic downward trend. Vulnerable employment fell below 45 % in 2007, below 40% in 2013, and below 35% in 2020. No major reversals were observed in the series. Annual changes are generally gradual,



Source: Authors' illustration using world bank data

Figure 2: Female unemployment trend in China



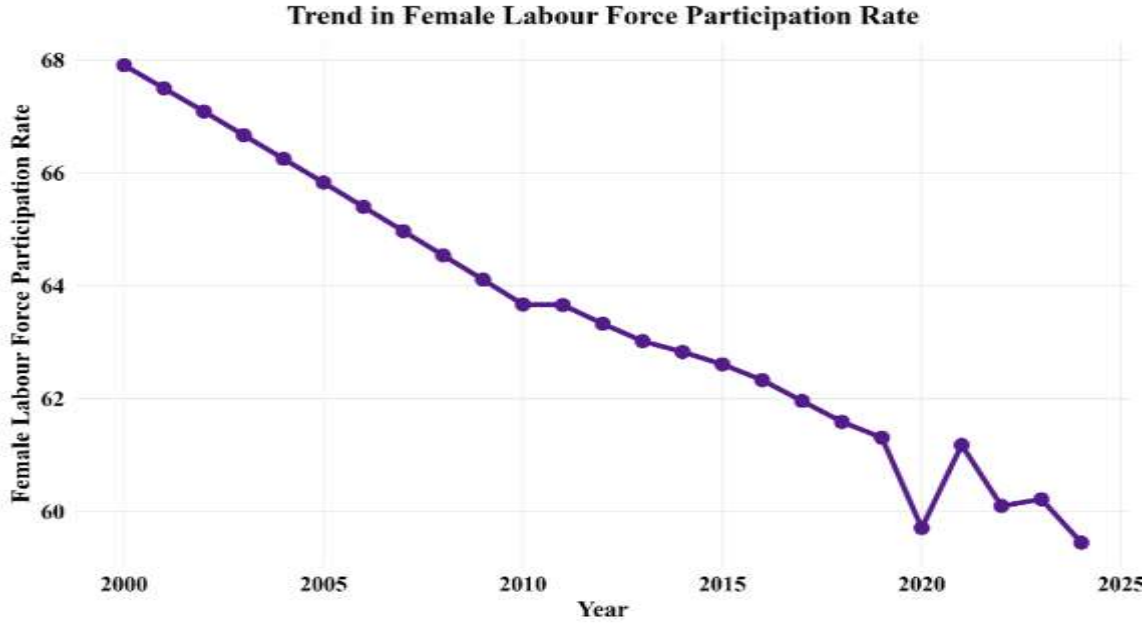
Source: Authors' illustration using World Bank data
Figure 3: Female vulnerable employment trend in China

which gives the graph a smooth downward slope and suggests sustained structural movements over time rather than abrupt shifts.

In terms of variability, the indicator shows a wide range, from a maximum of 51% in 2000 to a minimum of 33.2% in 2024. The pattern in Figure 3 indicates a steady erosion in the share of women located in more vulnerable forms of employment over the sample period.

Female labour force participation trend

Figure 4 presents the trend in female labour force participation. Unlike vulnerable employment, the



Source: authors' illustration using World Bank data

Figure 4: Female labour force participation trend in china

series displayed a consistent decline, but at a more moderate pace. Female labour force participation fell from 67.9% in 2000 to 59.5% in 2024. This amounts to an absolute decline of 8.5 percentage points, equivalent to approximately 12.5% of the initial level.

The graph indicates a gradual downward movement throughout most of the study period. Participation dropped from 67.9% in 2000 to 63.7% in 2010, and then continued to fall to 59.7% in 2020. A temporary rebound was visible in 2021, when the rate rose to 61.2%, but this did not persist. By 2024, the indicator fell to its lowest point in the series at 59.5%.

Therefore, the long-run direction of the graph is clearly negative. The decline is smoother than the unemployment series and less steep than the fall in vulnerable employment; however, it still indicates a marked reduction in women's labour market participation over the twenty-five-year period.

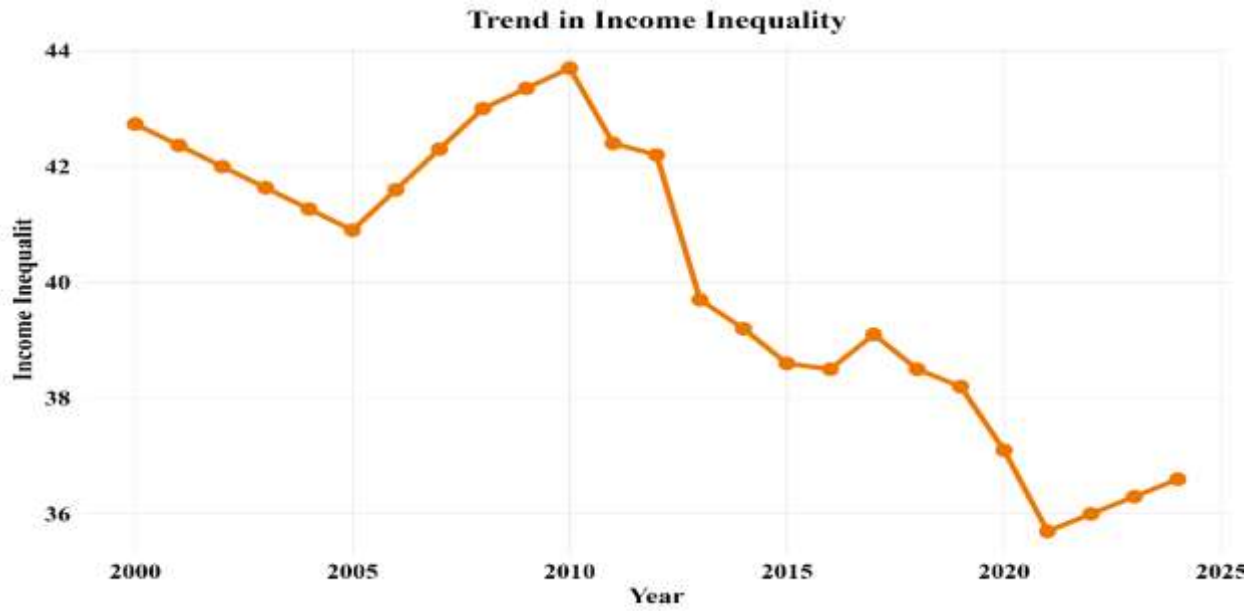
Income inequality trend

Figure 5 shows the trend in income inequality as measured by the Gini index. The graph shows that inequality did not move in a strictly linear direction over the full period. Instead, it exhibited an initial increase, followed by a sustained decline.

Income inequality stood at 42.7 in 2000 and peaked at 43.7 in 2010. This indicates a phase of rising inequality in the first decade of the sample period. Thereafter, the graph shows a broad downward trend. The Gini index fell from 42.4 in 2011 to 35.7 in 2021, the minimum value recorded in the series. A mild uptick is visible in the last three years, with the index increasing to 36.6 in 2024. Comparing the start and end points, the Gini index declined by 6.1 points over the full period, representing a net reduction of approximately 14.4 %. Thus, Figure 5 presents a hump-shaped pattern rather than a monotonic trend: inequality rose during the earlier years, peaked around 2010, and then declined substantially, with only limited recovery at the end of the sample period.

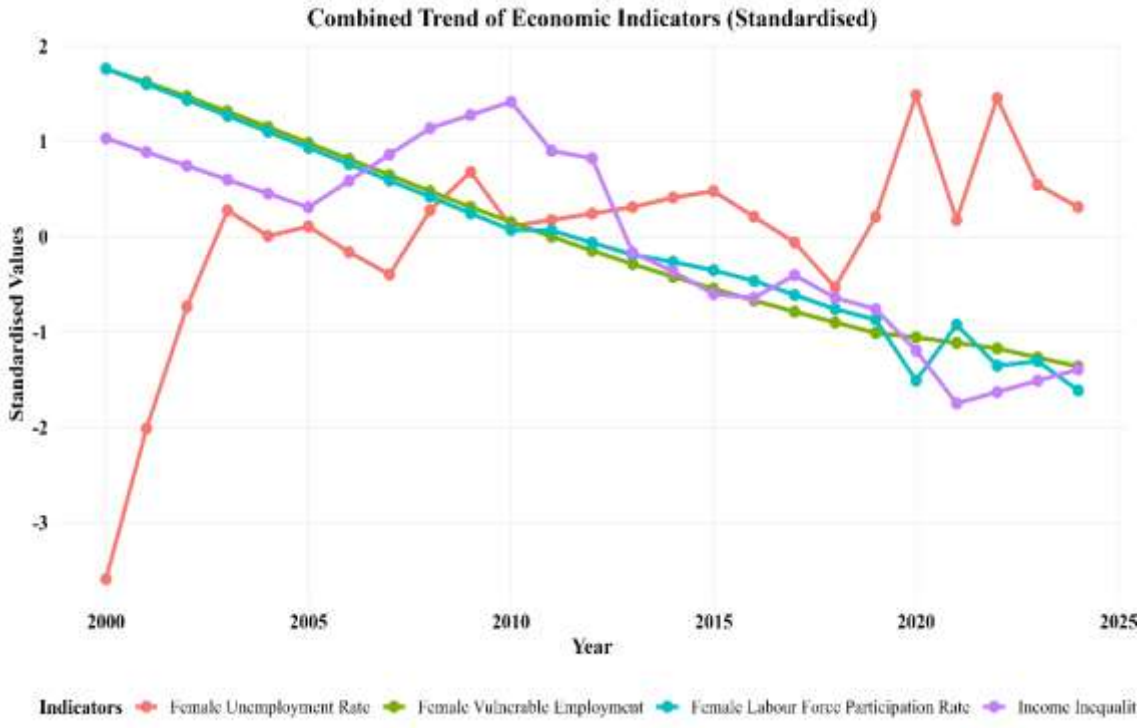
Comparison of suicide and economic indicators

Figure 6 presents the standardised comparison graph in which the female suicide rate and economic indicators are transformed onto a common scale.



Source: Authors' illustration using World Bank data

Figure 5: Income inequality trend in china



Source: Authors' illustration using World Bank data

Figure 6: Standardised comparison of suicide and economic indicators in China

This standardisation is useful because the variables are originally measured in different units and at different magnitudes. By removing scale differences, the graph allows for a direct visual

comparison of relative movements and turning points.

The standardised graph shows that the female suicide rate and female vulnerable employment exhibit closely aligned downward movements over much of the sample. Both series began above their long-run means in the early 2000s and moved steadily downwards over time. Female labour force participation also trends downward but with a flatter slope than vulnerable employment. Female unemployment shows a more modest standardised fluctuation, with visible deviations around the early 2000s, 2009–2010, and 2020–2022. Income inequality appears comparatively distinct, rising above its mean until around 2010, before descending below it in later years.

The graph also shows the convergence and divergence phases. During the 2000–2010 period, suicide and vulnerable employment moved together in a downward direction, while inequality remained comparatively elevated. From around 2011 onwards, suicide, vulnerable employment, and inequality all moved downward for a time, producing visible convergence. In the final years, however, the recent rise in the suicide series contrasts with the continued decline in vulnerable employment, creating a renewed divergence.

Overall, the standardised graph provides a clearer comparative view of the relative fluctuations in the data than the raw, combined trend graph. It shows most strongly that the female suicide rate shares its closest long-run visual alignment with vulnerable employment, followed by labour force participation, while unemployment and inequality display more intermittent correspondence.

Dual-axis comparison of suicide and labour market indicators

Figure 7 places the female suicide rate alongside female unemployment and female vulnerable employment on a dual-axis plot. This graph is useful because it enables a visual comparison of suicide vulnerability with two core labour market indicators of insecurity.

The graph shows that the female suicide rate and female vulnerable employment move broadly in the same direction over much of the period, especially from 2000 to 2020. Both indicators show a downward trend, with the suicide rate falling from 15.2 to 7.1 and vulnerable employment declining from 50.9 to 34.9 over the same interval. The co-directional movement is particularly visible during the long phase of falling suicide rates between 2000 and 2015.

The pattern is less similar for female unemployment rates. While unemployment increased from 2.8% in 2000 to 4.3% in 2020, suicide rates simultaneously fell. This indicates divergence rather than a parallel movement between the two series across much of the sample. In the final years, however, the graph suggests a partial convergence in the sense that suicide rose modestly after 2020 while unemployment remained elevated relative to its early-sample levels.

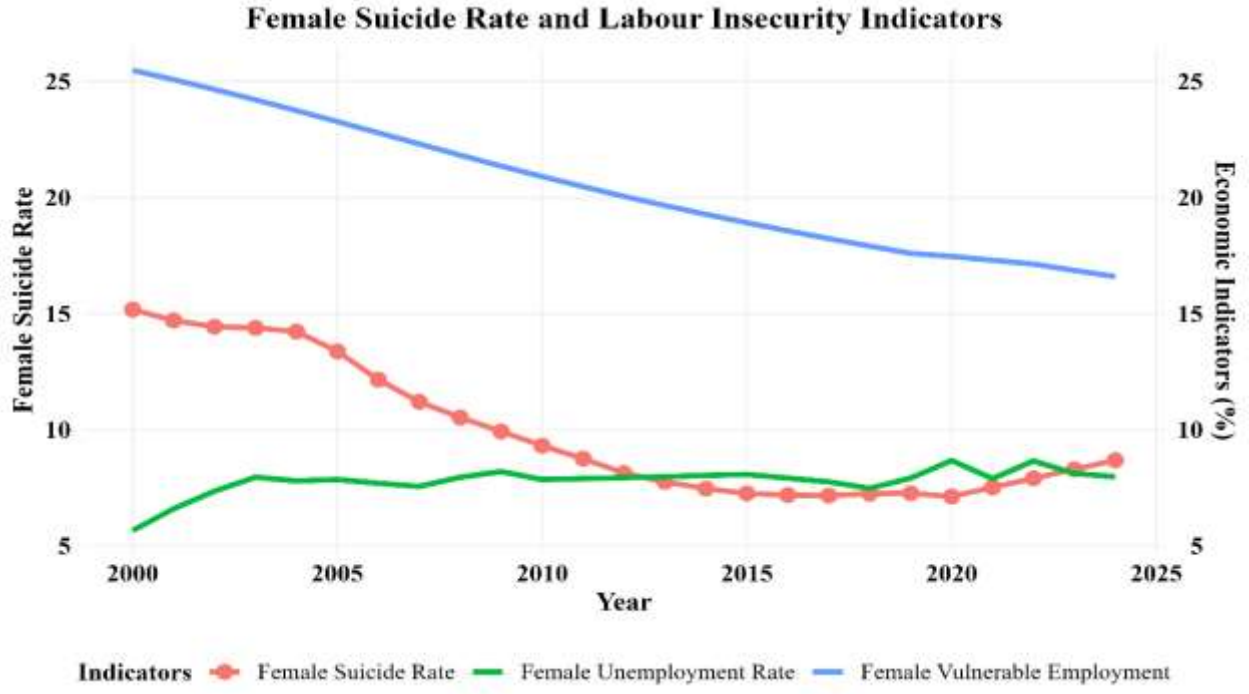
Overall, Figure 8 highlights a stronger visual correspondence between the female suicide rate and vulnerable employment than between the female suicide rate and unemployment. It also shows that the labour market dimensions represented by unemployment and vulnerability do not behave identically in the dataset.

Employment structure dynamics

Figure 8 compares female wage employment with female vulnerable employment, illustrating the structure of women's employment over time. The graph displays a pronounced rebalancing in favour of wage and salary employment.

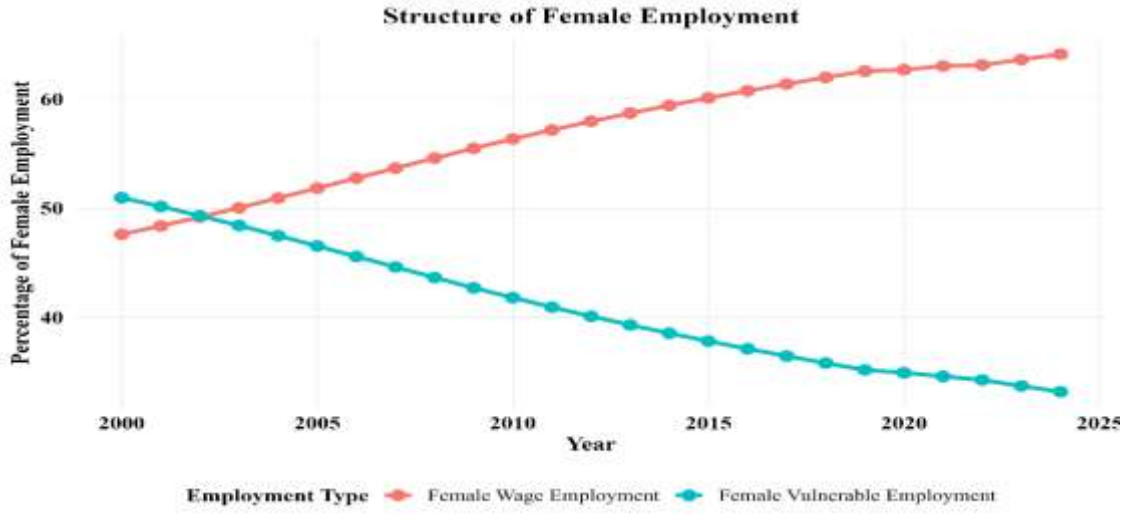
Female wage employment rose steadily from 47.6% in 2000 to 64.1% in 2024, an increase of 16.5 percentage points or about 34.6%. By contrast, female vulnerable employment fell from 50.9% to 33.2% over the same period. The two series move in opposite directions and gradually separate over time. A crossing point occurs early in the sample. In 2000, vulnerable employment slightly exceeded wage employment, but by 2002 the two series were already very close at 49.3% and 49.2%, respectively. From 2003 onwards, wage employment overtook vulnerable employment, and the gap widened continuously. By 2024, the spread between them had reached 30.9 percentage points.

The graph therefore shows a clear transformation in employment composition. Over time, women's employment became increasingly concentrated in wage and salaried work, while the share in vulnerable employment declined steadily.



Source: Authors' illustration using World Bank data

Figure 7: Dual-Axis trend graph (Suicide and labour insecurity indicators)



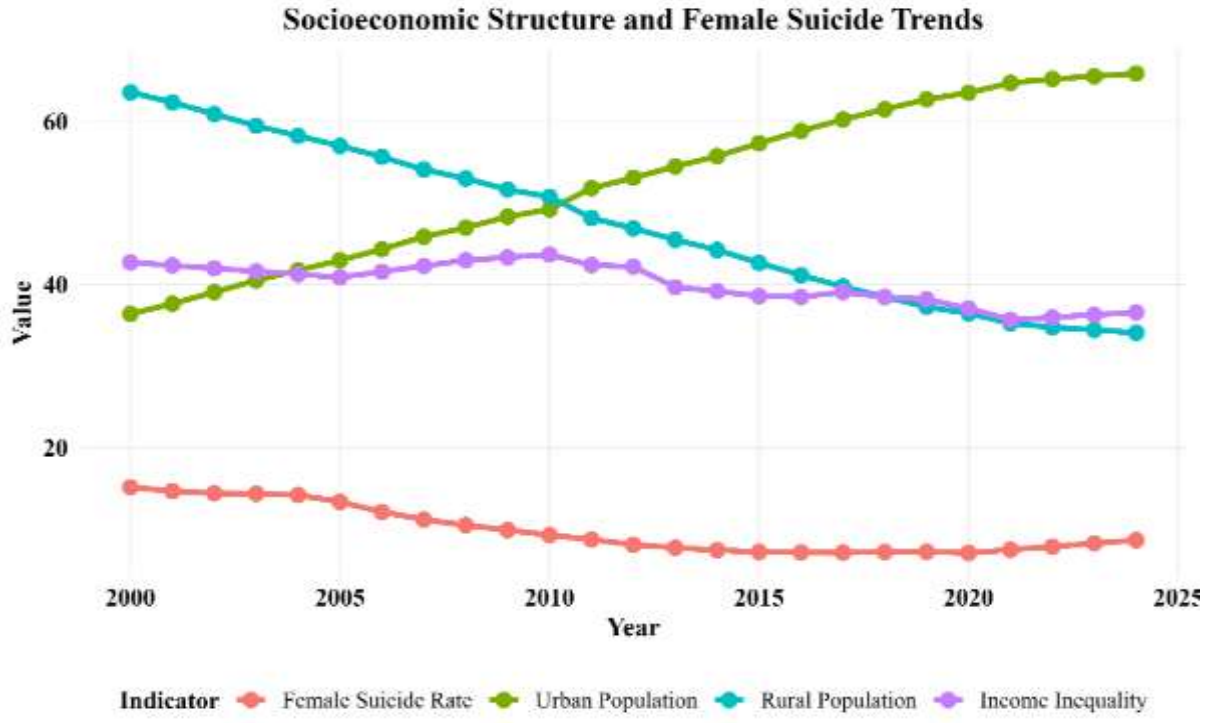
Source: Authors' illustration using World Bank data

Figure 8: Structure of female employment in China

Socioeconomic structural transformation

Figure 9 combines female suicide rate, urban population, rural population, and income inequality. The graph reveals a substantial structural transformation in the socioeconomic profile of China over the study period.

The urban population rose continuously from 36.4% in 2000 to 65.9% in 2024, representing an increase of 29.46 percentage points. Rural



Source: Authors' illustration using World Bank data

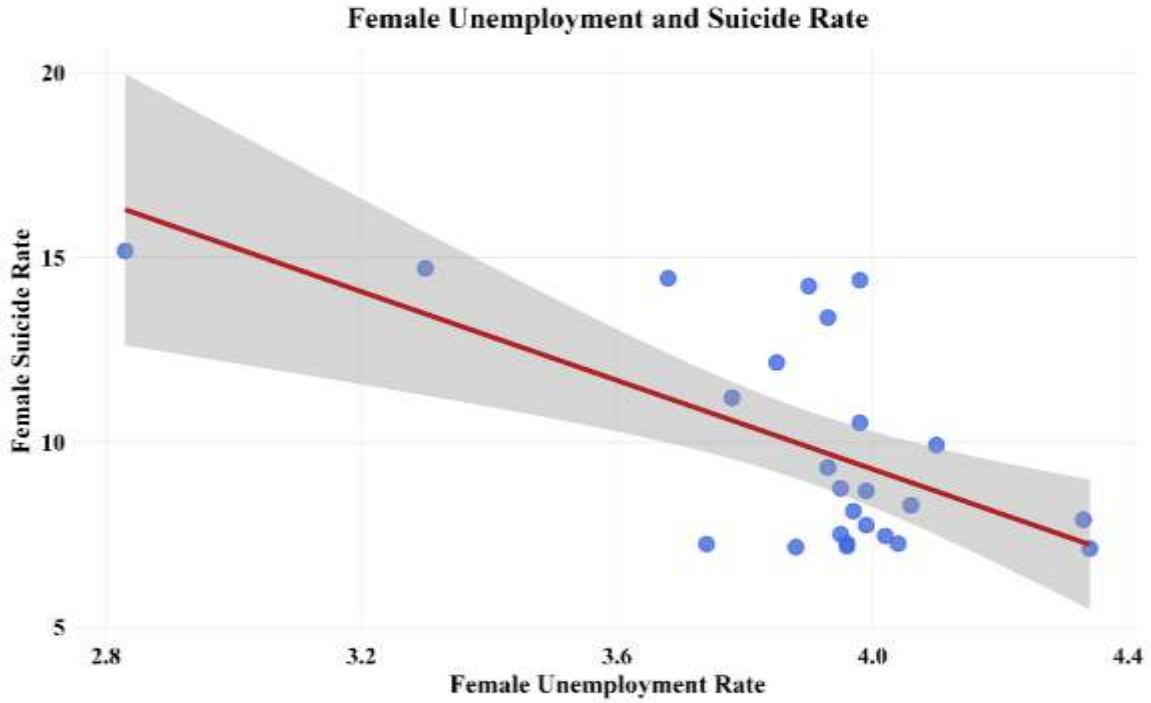
Figure 9: Socioeconomic structure and female suicide trends

population, by construction, moved in the opposite direction, falling from 63.6% to 34.1% over the same period. The two series crossed between 2010 and 2011, marking the point at which the urban share exceeded the rural share. This constitutes one of the most visible demographic shifts in the graph. Income inequality follows a different pattern. It increased up to 2010 and then declined, positioning it between the demographic transformation and the suicide trend in terms of temporal shape. The female suicide rate itself moved downward over much of the period, but unlike urbanisation, it did not continue falling to the end of the sample. Instead, it flattened and then rose slightly after 2020. The graph thus shows three distinct structural patterns: sustained urban expansion, sustained rural contraction, and a hump-shaped inequality trend. The suicide series occupies a lower numerical range than the population indicators, but when viewed jointly, the graph shows that the long-run fall in suicide occurred alongside profound demographic restructuring and changing inequality levels.

Scatter plot analysis of female suicide vulnerability and unemployment

Figure 10 plots female suicide rate against female unemployment rate. The scatter suggests a generally negative relationship. Observations associated with lower unemployment in the early years tend to correspond to higher suicide rates, while many of the later observations cluster around higher unemployment and lower suicide rates.

The distribution of points is not tightly concentrated around a single line, indicating moderate dispersion. This is consistent with the fact that unemployment varies over a fairly narrow interval, from 2.8 to 4.3 per cent, while suicide rates vary much more widely, from 7.1 to 15.2. The fitted line therefore slopes downward, but the cloud of observations is relatively broad.The graph also reveals clustering across time. Early-period observations are located in the upper-left portion of the scatter, reflecting high suicide and lower unemployment.



Source: Authors' illustration using World Bank data

Figure 10: Scatter plot of female unemployment and suicide rate

Later-period observations are more concentrated toward the lower-middle and lower-right portions, indicating lower suicide rates combined with moderate unemployment rates. The overall scatter pattern is therefore downward sloping but not sharply linear.

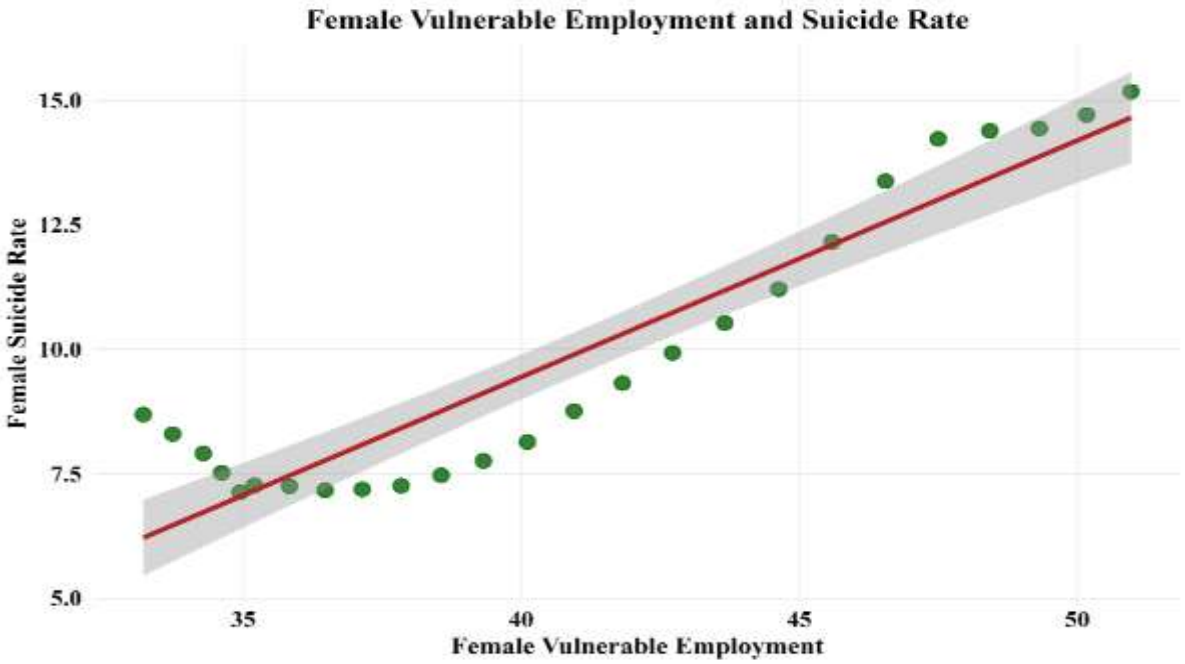
Scatter plot analysis of female vulnerability employment and unemployment

Figure 11 plots female suicide rate against female vulnerable employment. In contrast to Figure 11, this scatter displays a clear positive relationship. Higher levels of vulnerable employment are associated with higher female suicide rates, and lower levels of vulnerable employment correspond to lower suicide rates.

The point distribution is more tightly aligned than in the unemployment scatter, indicating less dispersion around the fitted line. This reflects the fact that both variables follow strong downward trends over time. Early observations with vulnerable employment above 45% are associated with suicide rates above 12 per 100,000, whereas later observations with vulnerable employment around 33 to 36% correspond to suicide rates mostly below 9 per 100,000.

The fitted line therefore slopes upward quite clearly, and the overall scatter pattern appears more compact. Among the two scatter plots, the visual relationship between vulnerable employment and female suicide is stronger and more systematic than that between unemployment and female suicide.

Taken together, the graphical results show substantial long-run changes in female suicide vulnerability, labour market conditions, employment composition, inequality, and demographic structure in China between 2000 and 2024. The female suicide rate declined sharply over most of the period; female vulnerable employment and labour force participation both fell; female wage employment increased; inequality first rose and then declined, and the economy experienced a pronounced shift from rural to urban population structure. The combined, standardised, dual-axis, and scatter plots further show that the visual association between female suicide and vulnerable



Source: Authors' illustration using World Bank data

Figure 11: Scatter plot of vulnerable employment and suicide rate

employment is stronger and more consistent than that between female suicide and unemployment. These empirical patterns provide the basis for the interpretive discussion in the next section.

Discussion

This study set out to examine how multidimensional economic insecurity and structural socioeconomic change relate to female suicide vulnerability in China. The results provide four clear answers to the research questions. First, female suicide vulnerability declined markedly over 2000 to 2024, although this long downward trajectory weakened and modestly reversed after 2020. Second, the indicators of gendered labour market insecurity did not move uniformly: female vulnerable employment declined steadily, female wage employment increased, female labour force participation fell gradually, and female unemployment fluctuated within a relatively narrow but mildly rising range. Third, the relationship between female suicide vulnerability and economic insecurity was strongest and most consistent for vulnerable employment, while the association with unemployment was weaker and visually more dispersed. Fourth, broader structural socioeconomic change, particularly declining inequality after 2010 and the shift from a predominantly rural to a predominantly urban population, coincided with the long-run fall in female suicide rates. The novelty of the study lies in its integrated descriptive framework, which moves beyond single macroeconomic indicators to examine female suicide vulnerability alongside labour market insecurity, employment structure, income inequality, and demographic transformation within one unified analytical lens.

These findings fit well within the broader literature, while also extending it in a more gender-sensitive direction. The sustained decline in female suicide rates is consistent with evidence that China experienced one of the world's most substantial reductions in suicide mortality during the period of rapid economic development, urbanisation, and improvements in healthcare access.[11,1,32,33,34] At the same time, the stronger visual alignment between female suicide and vulnerable employment reinforces arguments that female suicide cannot be reduced to psychiatric determinants alone but is

closely embedded in socioeconomic systems and gendered inequalities.[35,9,36,37]

The results also resonate with evidence from India and other low- and middle-income settings showing that economic hardship, low socioeconomic status, indebtedness, and precarious livelihoods can intensify suicide risk among women.[7,8] However, the present findings refine this literature by suggesting that not all economic indicators carry equal descriptive relevance. In particular, vulnerable employment appears to capture women lived economic insecurity more effectively than unemployment alone, which is important given prior concern that aggregate macroeconomic measures often provide only a partial account of economic stress.[18,3]

The results can be interpreted through the theoretical lenses set out earlier. From the standpoint of strain theory, vulnerable employment, insecure labour market positions, and declining labour force attachment may generate persistent frustration when women cannot attain stable income, predictable livelihoods, or socially valued economic roles Merton.[23]

The close co-movement between suicide and vulnerable employment suggests that employment quality may matter as much as, or more than, employment status itself. This is plausible because precarious work often combines unstable income, low bargaining power, weak social protection, and chronic uncertainty, all of which can intensify psychological strain. The social determinants of health framework offer a complementary explanation. Labour market insecurity and inequality are not merely economic conditions; they shape everyday exposure to stress, access to healthcare, social support, and long-term resilience Marmot et al.[24] In this sense, the long fall in vulnerable employment and inequality may have reduced structural stressors for many women, thereby coinciding with the long decline in suicide vulnerability.

Recent empirical evidence further reinforces the multidimensional nature of socioeconomic determinants of health and well-being. Nan and Jay.[43] demonstrate that healthcare service capacity, particularly delivery volume, has a causal effect on severe maternal health outcomes. Tian and Pan.[44] show that hospital bed supply and inequality significantly influence maternal mortality patterns in China. Ma and Bennett.[45] identify employability perceptions as key determinants of individual socioeconomic positioning and future welfare outcomes. Hong et al.[46] highlight that time allocation within households plays a critical role in shaping family well-being and overall life satisfaction.

Chen et al.[47] provide evidence that biological vulnerabilities, such as genetic predisposition, interact with environmental conditions to influence disease outcomes. Yadav et al.[48] reveal that early-life socioeconomic disadvantages, including school dropout, early marriage, and early childbearing, have long-term adverse effects on women's mental health. Qiao et al.[49] show that adaptive coping mechanisms, such as therapeutic travel, can help mitigate psychological distress among vulnerable populations. Fei and Wang[50] demonstrate that social norms, particularly parental gender preferences, continue to shape fertility behaviour and long-term household welfare dynamics. Taken together, these studies reinforce the argument that female suicide vulnerability is embedded within a broader system of health, socioeconomic, demographic, and behavioural factors.

The findings also have important public policy implications. The dual-axis and standardised graphs indicate that women's suicide vulnerability is more closely tied to insecure forms of work than to the narrow unemployment rate. This implies that policy aimed only at job creation may be insufficient if new employment remains precarious, low-paid, or weakly protected. Strengthening the quality and security of women's employment is therefore central. Policies that expand social insurance coverage, reduce informality, improve maternity and care protections, enforce fair labour standards, and support women's transition into stable wage employment may have wider mental health benefits. This has direct relevance for SDG 3 on good health and well-being, particularly the reduction of premature mortality from non-communicable and mental health-related causes, and for SDG 5 on gender equality, especially in relation to women's economic empowerment and equal access to decent work. It also aligns with SDG 8, which emphasises productive employment and

decent work for all, and SDG 10, which calls for reduced inequality. The structural transformation shown by rising urbanisation and falling rural population further suggests the need for place-sensitive policy, especially for women in communities still exposed to weaker labour protections, lower incomes, and reduced access to mental health services.

Overall, the findings suggest that female suicide vulnerability in China is best understood not simply as an individual mental health issue, but as an outcome embedded in labour market insecurity and wider socioeconomic transformation. The long-run decline in female suicide rates appears to have coincided with reduced vulnerable employment, lower inequality after 2010, growing wage employment, and profound demographic restructuring, although the post-2020 uptick warns against assuming linear progress. For policy, the key implication is that suicide prevention for women should be linked more closely to employment quality, social protection, inequality reduction, and equitable access to health services, particularly in contexts of rapid social change.

Strength and weakness

A major strength is the use of multiple graphical approaches, including standardised trends, dual-axis comparison, employment-structure dynamics, and scatter plots, also improves the robustness of the descriptive narrative by showing where patterns converge and where they diverge. The analysis is further strengthened by its explicit focus on women, which responds to the longstanding tendency in the literature to generalise from aggregate suicide patterns without adequately examining gender-specific socioeconomic mechanisms. In addition, the China case is analytically valuable because it combines rapid growth, labour market restructuring, urbanisation, and changing inequality within one national setting.

The study nonetheless has limitations and these should temper interpretation. First, the evidence is descriptive and based on graphical co-movement, so the analysis cannot establish causal relationships. Observed alignment between suicide and vulnerable employment, for example, may be influenced by omitted institutional, cultural, or health-system factors. Second, some indicators remain broad proxies. Unemployment rates may understate women's economic insecurity where labour market withdrawal, unpaid care burdens, or informal work remain substantial.

Third, the study does not directly model psychiatric morbidity, social support, family dynamics, or access to mental health care, all of which are important in suicide research. Fourth, although the literature points to age-related heterogeneity in female suicide vulnerability, the present dataset does not allow age-disaggregated empirical analysis. These limitations do not invalidate the findings, but they indicate that the study should be read as a structural descriptive contribution rather than a definitive causal account.

Conclusion

This study examined how multidimensional economic insecurity and structural socioeconomic change relate to female suicide vulnerability in China. Specifically, it analysed the temporal evolution of female suicide vulnerability, traced changes in gendered labour market insecurity through female unemployment, vulnerable employment, wage employment, and labour force participation, investigated the relationship between female suicide vulnerability and key indicators of economic insecurity, and assessed how broader structural factors, notably income inequality and urban–rural population transformation, coincided with changes in female suicide vulnerability.

The findings reveal a marked long-run decline in female suicide rates between 2000 and 2024, although this improvement weakened with a modest reversal after 2020. Over the same period, female vulnerable employment fell steadily, female wage employment rose, female labour force participation declined, and female unemployment remained comparatively narrow but mildly upward trending. Among the indicators examined, vulnerable employment showed the clearest and most consistent visual alignment with female suicide vulnerability, whereas unemployment displayed a weaker and more diffuse association.

The broader structural context also mattered: declining income inequality after 2010 and the transition from a predominantly rural to a predominantly urban population coincided with the long-run reduction in female suicide rates. Taken

together, these patterns suggest that women's suicide vulnerability in China is closely embedded in labour market quality, employment security, and wider socioeconomic transformation rather than being adequately explained by narrow macroeconomic or purely clinical accounts.

The significance of these findings lies in their contribution to both scholarship and policy. Conceptually, the study advances the literature by moving beyond single-indicator approaches and offering an integrated framework that links female suicide vulnerability to labour market insecurity, employment structure, inequality, and demographic change. Empirically, it provides gender-sensitive evidence from China, a setting where rapid economic and social transformation has profoundly reshaped women's risks and opportunities. Practically, the findings are relevant for policymakers, public health planners, labour institutions, and gender advocates because they indicate that suicide prevention among women should be connected to employment quality, social protection, and inequality reduction, not only to mental health services alone.

Future research should build on this descriptive foundation through causal and disaggregated analysis. In particular, there is need for region-specific and age-sensitive investigation, as well as studies that incorporate mental health service access, family conditions, and informal labour experiences. Such work would deepen understanding of how structural economic insecurity translates into suicide vulnerability across different groups of women and strengthens the design of more targeted interventions.

Conflict of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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Data availability

The data used for this study are publicly available. Additional details or datasets can be obtained from the corresponding author upon reasonable request.

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