The dynamics of wage inequality in Thailand: a decomposition analysis

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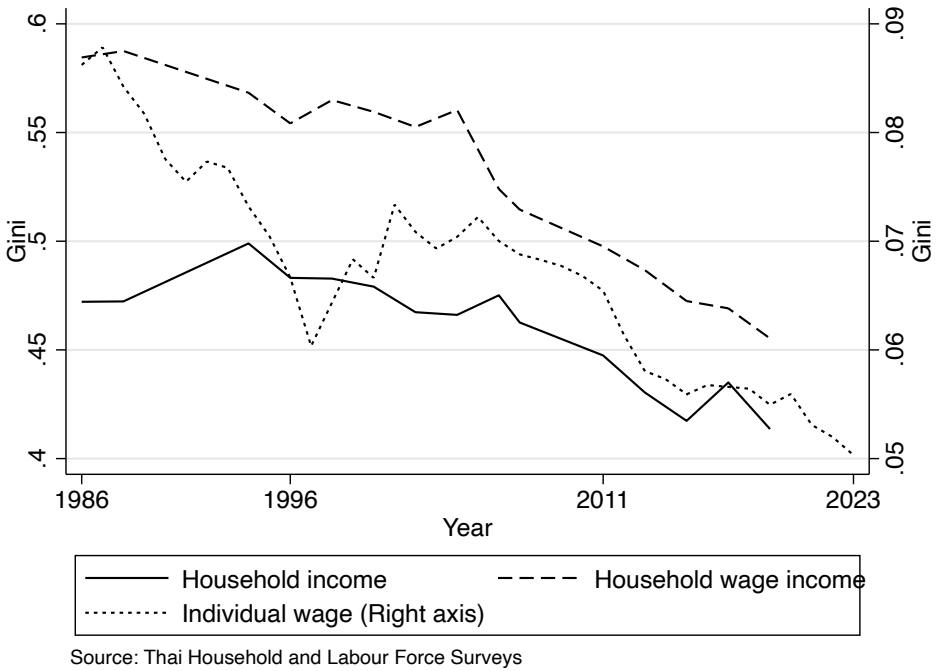
Wage inequality has declined in Thailand



Source: Thai Household and Labour Force Surveys

- The decline in inequality occurs both at the individual and household levels.
- Individual wage inequality has broadly declined, except an increase between 1997 and 2006.

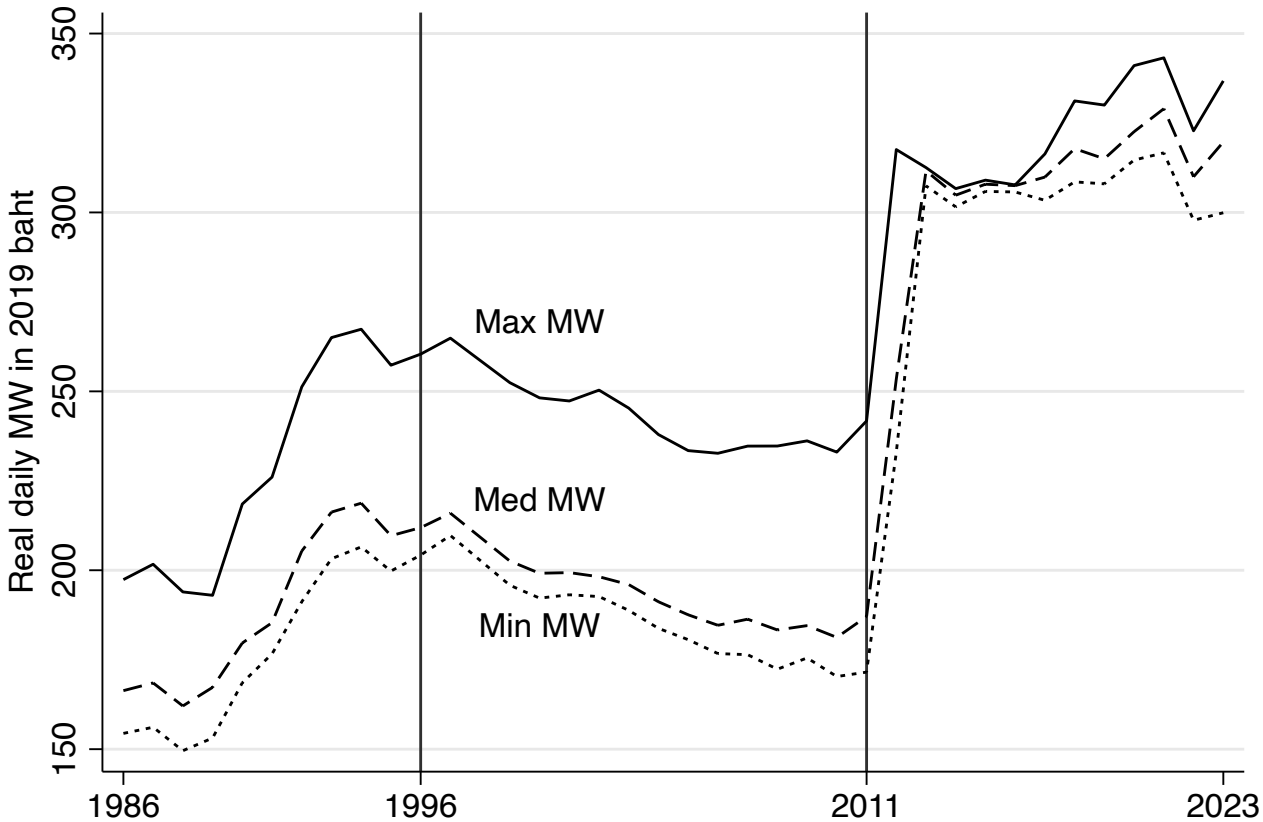
What explains the dynamics of wage inequality in Thailand?

- This work uses a decomposition method to break down changes in inequality into different factors including minimum wage (MW), labour composition and wage structure. I apply the methods developed by [DFL96], [CFM13] and [FLL21] to the Thai data.
- While the decomposition analysis does not reveal causality, it can provide a useful starting point for understanding the proximate drivers of inequality.
- [Was+19], [Lek+20] and [Jen18] have reinvigorated the study on drivers of income inequality in Thailand. On MW,
- [Lec15] finds that Thailand's MW policy between 1985 and 2010 helps compress the lower part of wage distribution for employees in large businesses.
- This work aims to complement the prior work by putting MW as well as other potential drivers into a unified framework, covering the post-2012 MW hike period.

Minimum wages in Thailand: 1986-2023

Three sub-periods:

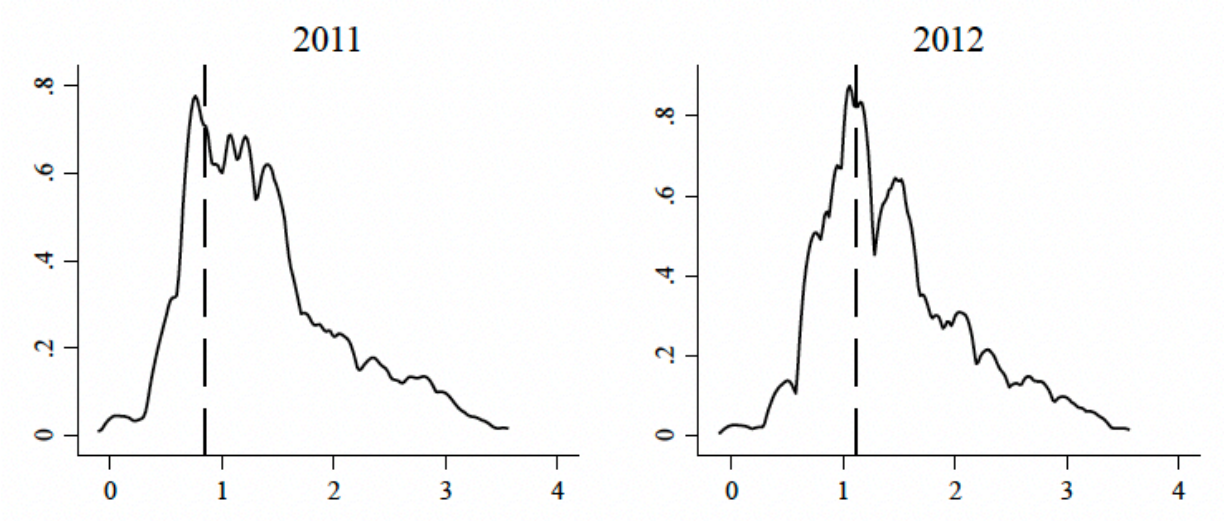
- 1986-1996: a gradual increase
- 1997-2010: a steady and slight decline
- 2011-2023: a big jump in 2012 followed by a steady increase



Source: Ministry of Labour and BOT.
Note: Since MW can differ across provinces, the figure shows maximum, median and minimum MW.

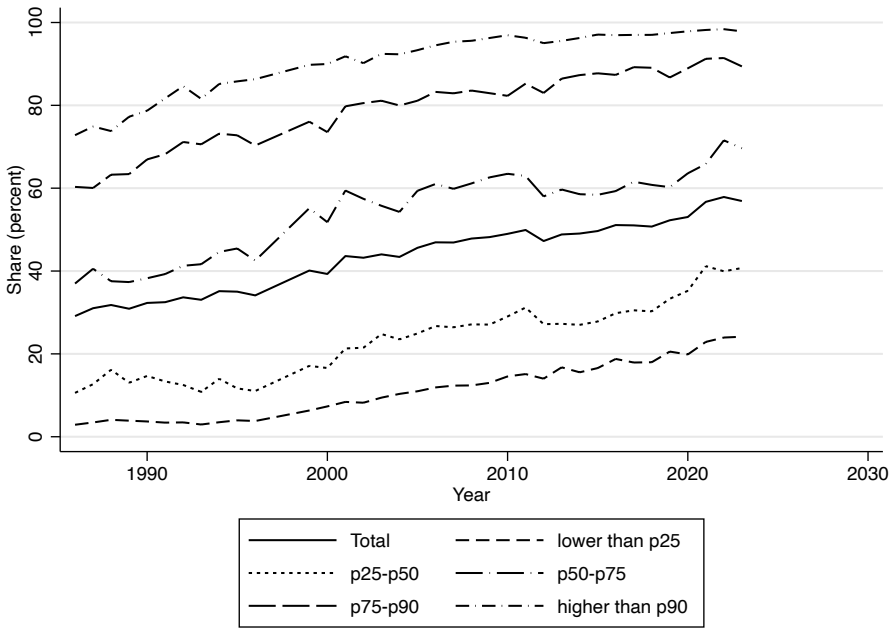
Wage distribution moves with minimum wage

Wage distribution in Thailand in 2011 vs 2012

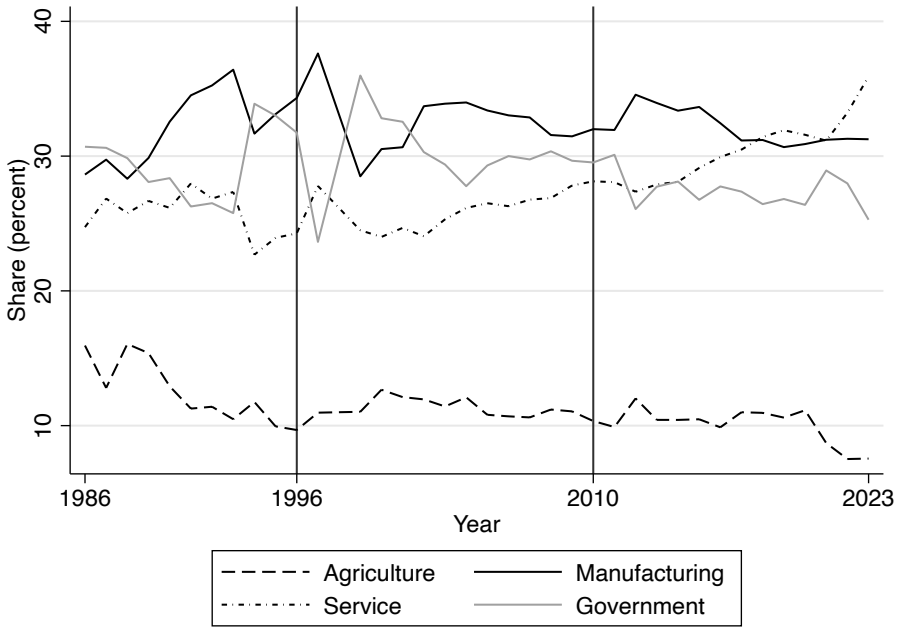


Change in labour composition

The share of high-educated wage earners has risen...

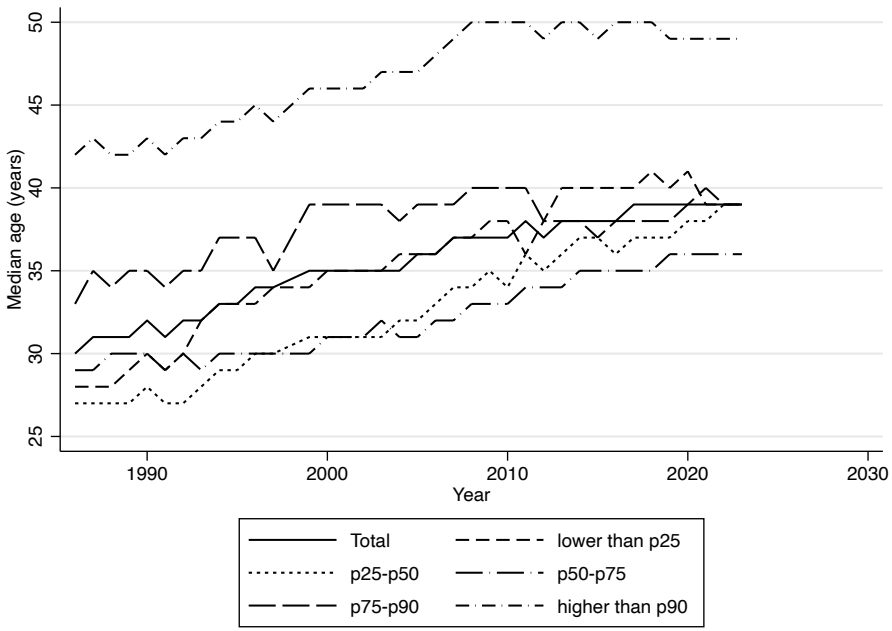


...while the occupational structure shifted.

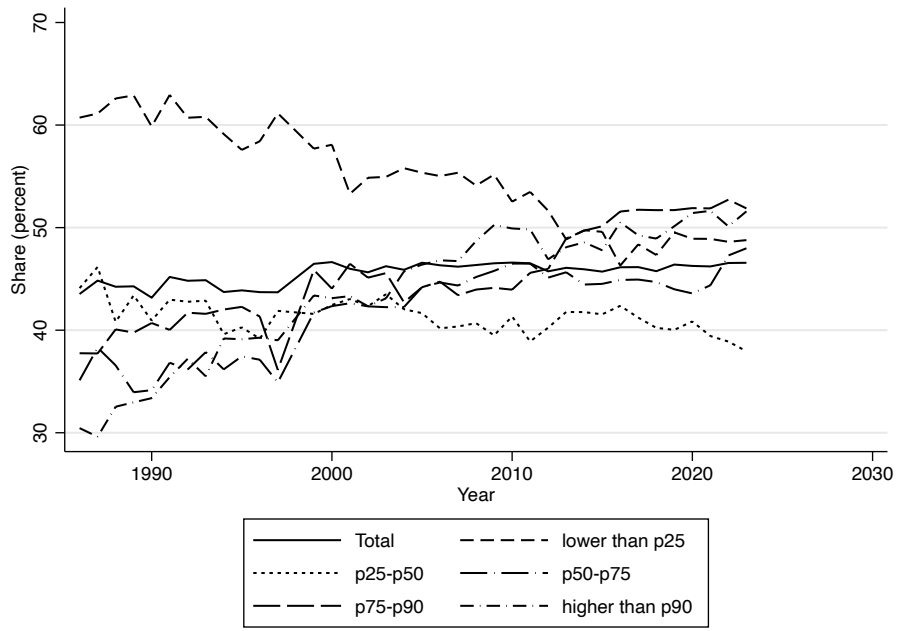


Change in labour composition II

The median age has increased across all income brackets

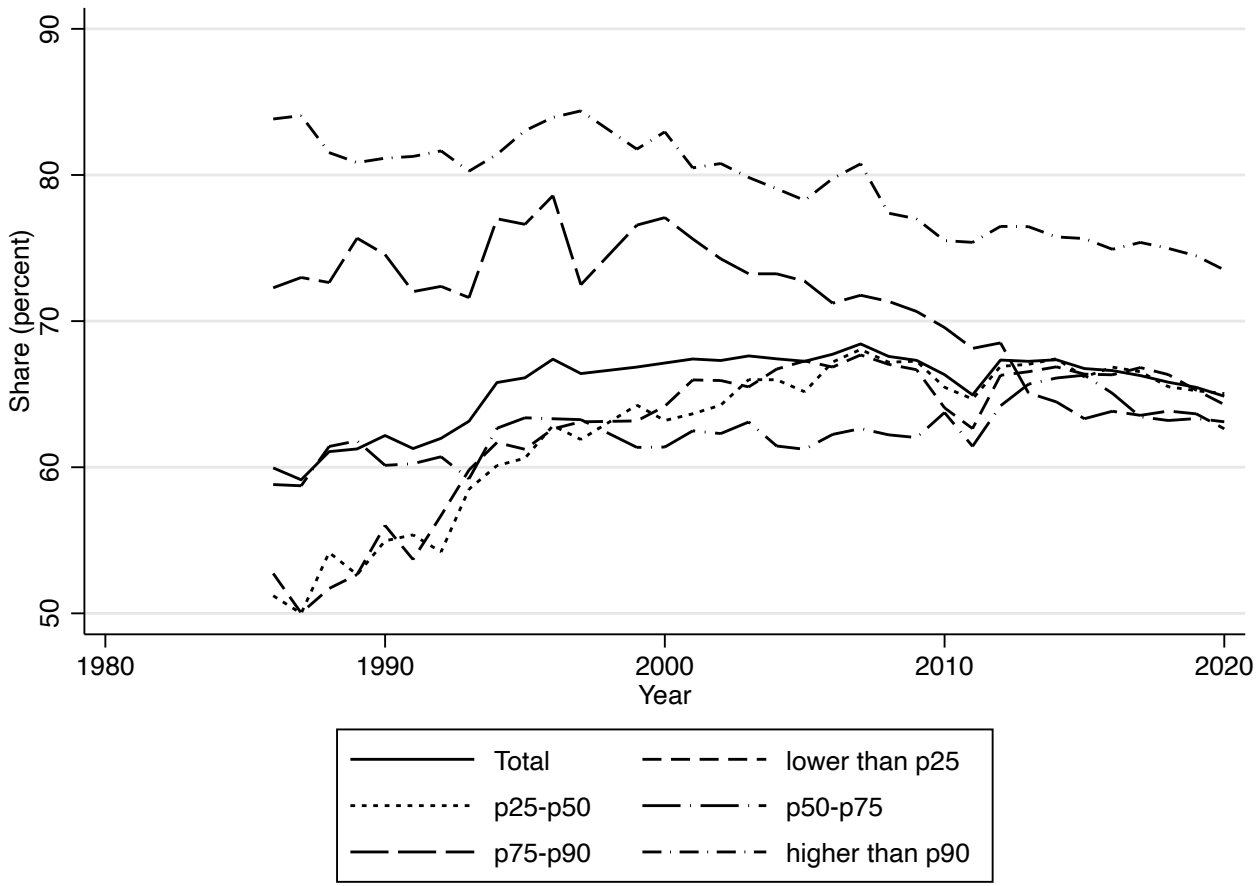


...as well as in the share of female wage earners.



Change in labour composition III

The share of married workers has declined in high income brackets.



Data

The Labour Force Survey (LFS) from 1986 to 2023

- Cross-sectional data on employment conditions in Thailand. Use the survey's third round (July-September) to include seasonal agricultural workers.
- Include currently employed wage earners aged between 18 and 65. Self-employed workers are excluded. LFS provides information on wage earners' wage, work status, industry, education and other personal attributes.
- Wage is expressed in daily, 2019 baht term. All inequality measures are based on natural log of wage.

CFM Counterfactual decomposition

- Oaxaca and Blinder decomposition: breaking down the observed difference in average wages between men and women into two components –
  - difference in characteristics between men and women (composition effect)
  - difference in how a certain characteristics is paid between men and women (price effect)
- Chernozhukov et al. (CFM 2013) build a decomposition method that can incorporate changes in MW and can estimate the difference across the entire distribution of wages (in addition to average wages).
- By relying on CFM method, we can break down the observed change in wage distribution between two periods into four components:
  - MW change
  - Change in educational composition
  - Change in other labour composition
  - Change in the price effect

CFM Counterfactual decomposition II

Let $F_{Y<(t,s)|(r,v)>}$ denote the counterfactual distribution of wages when the wage structure is as in year t, the minimum wage M is at the level observed in year s, the educational composition, E , is distributed as in year r and the labour composition is distributed as in year v.

Then, the difference in the observed wage distribution is the sum of the four effects from minimum wage, education, labour composition and wage structure:

$$\begin{aligned} F_{Y<(1,1)|(1,1)>}(y) - F_{Y<(0,0)|(0,0)>}(y) = & \left[F_{Y<(1,1)|(1,1)>}(y) - F_{Y<(1,0)|(1,1)>}(y)\right] + \\ & \left[F_{Y<(1,0)|(1,1)>}(y) - F_{Y<(1,0)|(0,1)>}(y)\right] + \\ & \left[F_{Y<(1,0)|(0,1)>}(y) - F_{Y<(1,0)|(0,0)>}(y)\right] + \\ & \left[F_{Y<(1,0)|(0,0)>}(y) - F_{Y<(0,0)|(0,0)>}(y)\right] \end{aligned} \tag{1}$$

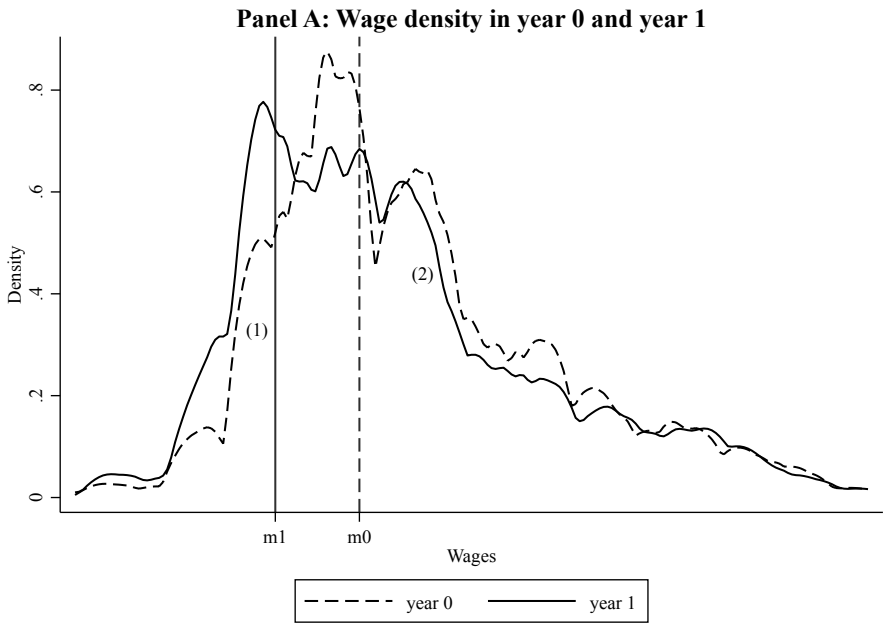
CFM counterfactual decomposition III

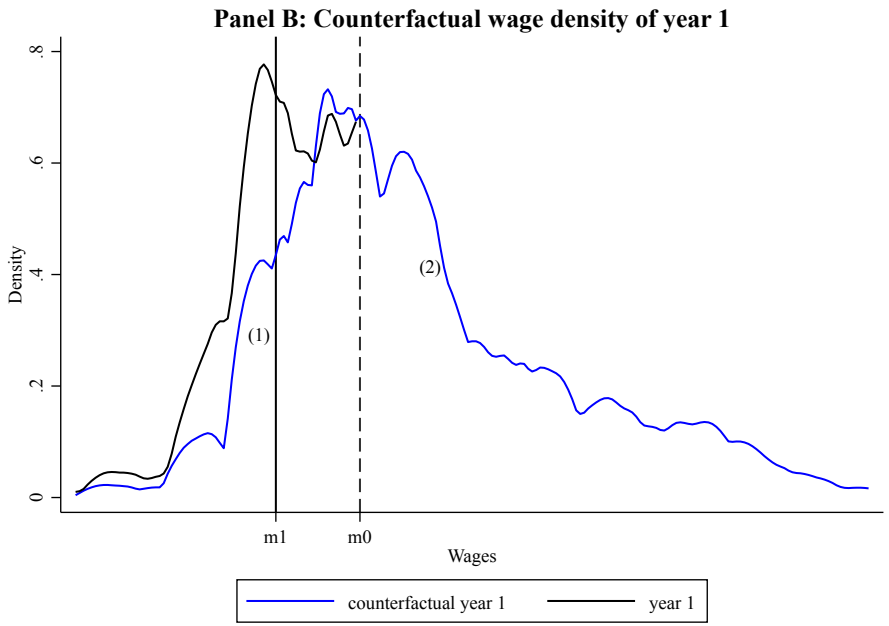
Constructing counterfactual distributions start with estimating $F_{Y(1,0)|X_1}(y|x)$. Three assumptions needed:

- Assumption 1: The minimum wage has no effects on employment probabilities.
- Assumption 2: The conditional distribution of wage *above* the highest minimum wage (m_0) is the same regardless of whether minimum wage is set.
- Assumption 3: For wages *at or below* m_0, the conditional density of wages that would prevail in year 1 if the minimum wage were raised back to m_0 is proportional to the conditional density of wages in year 0.

CFM counterfactual decomposition IV

$$F_{Y(1,0)|X_1}(y|x) = \begin{cases} F_{Y(0,0)|X_0}(y|x)\ \dfrac{F_{Y(1,1)|X_1}(m_0|x)}{F_{Y(0,0)|X_0}(m_0|x)} & \text{if } y \leq m_0 \\ F_{Y(1,1)|X_1}(y|x) & \text{if } y \geq m_0 \end{cases} \quad (2)$$





Accounting for MW spillover effect

- The CFM decomposition method breaks down changes in wage inequality into four sources, pointing to proximate drivers of wage inequality.
- Three main limitations:
  - Assume no-spillover effect of MW change
  - Use one MW
  - Cannot explain the mechanism when MW changes
- I apply a newly-developed decomposition method by Fortin, Lemieux and Lloyd (FLL 2021) to complement the result obtained from the CFM method.

FLL decomposition method

- The probability of an individual earning income above a cutoff is determined by individual attributes, MW and time and place fixed effect. With multiple cutoffs, we derive wage distribution.
- When MW in the area where an individual works changes, the probability changes accordingly.
- MW can exert effect on wage distribution through (1) reducing the probability of earning income below MW and (2) increasing the probability of earning income four wage bins above MW.
- I estimate this probability using the Thai Labour Force Survey (between 2011 and 2023), derive counterfactual distributions and quantify the (spillover) effect of MW on wage inequality.

Results

- An increase in MW contributes substantially to the decline in wage inequality. The spillover effect is present but limited.
- A higher educated workforce is inequality-enhancing.
- Wage structure became more unequal in the first period, but contributes negatively to inequality in later periods.
- The effect from other labour composition is mixed.

		Contribution from			
Ineq change	MW change	MW	Edu	Lab.Comp	Price
-	increase	-	+	-	+
+	decrease	+	+	+	-
-	increase	-	+	-/+	-

Period 1 (1986-1996): CFM decomposition

	(1)	(2)	(3)	(4)	(5)
Measure	Total change	Change due to			
		MW	Edu	Lab.Comp	Price
90-75	15	0 (0.0)	2.1 (14.2)	2.6 (17.5)	10.2 (68.4)
90-50	4.9	-16.7 (-343.2)	2.1 (43.5)	-0.3 (-6.9)	19.8 (406.5)
90-25	-26.5	-50.2 (-189.5)	0.8 (2.8)	-1.6 (-6.1)	24.6 (92.7)
75-50	-10.1	-16.7 (-165.6)	0 (0.0)	-2.9 (-29.2)	9.6 (94.8)
75-25	-41.5	-50.2 (-121.0)	-1.4 (-3.3)	-4.2 (-10.2)	14.3 (34.5)
50-25	-31.4	-33.5 (-106.7)	-1.4 (-4.4)	-1.3 (-4.1)	4.7 (15.1)
25-10	-5.7	-6.5 (-114.6)	-0.9 (-16.7)	-1.4 (-24.0)	3.2 (55.3)
SD	-11.4	-20.6 (-180.5)	0.6 (5.0)	-1.9 (-16.7)	10.5 (92.2)
Gini	-1.9	-2.6 (-136.4)	0 (2.4)	-0.3 (-14.3)	0.9 (48.2)

Note: Total change in wage inequality is a sum of contributions from four factors. Numbers in parentheses are percentage contributions. Standard Deviation (SD) and Gini coefficient are multiplied by 100 so changes are read in percentage points. For wage gaps, 90-75 is ($ln\ P90 - ln\ P75$) x 100 where $P90$ is (non-log) wage in the 90^{th} percentile, so it is a percentage difference between $P90$ and $P75$. Change in 90-75 is read in percentage points. For example, change in 90-75 of 14.8 means that the percentage difference between $P90$ and $P75$ increases by 14.8 percentage points.

Period 2 (1997-2010): CFM decomposition

	(1)	(2)	(3)	(4)	(5)
Measure	Total change	Change due to			
		MW	Edu	Lab.Comp	Price
90-75	17.6	0 (0.0)	1.5 (8.3)	25.9 (147.1)	-9.8 (-55.4)
90-50	21.7	0 (0.0)	16.1 (74.2)	16.2 (74.6)	-10.6 (-48.8)
90-25	30	7.6 (25.2)	9.6 (32.1)	27.4 (91.3)	-14.6 (-48.6)
75-50	4	0 (0.0)	14.6 (363.8)	-9.8 (-243.8)	-0.8 (-20.0)
75-25	12.4	7.6 (61.2)	8.2 (66.0)	1.5 (11.8)	-4.8 (-39.0)
50-25	8.4	7.6 (90.5)	-6.4 (-76.8)	11.2 (134.4)	-4 (-48.1)
25-10	-1	-13.9 (-1404.1)	6.9 (696.7)	4.4 (445.9)	1.6 (161.5)
SD	9.2	-0.3 (-2.8)	5 (54.5)	7.2 (78.1)	-2.7 (-29.9)
Gini	0.7	0 (-5.0)	0.4 (62.1)	0.6 (87.6)	-0.3 (-44.7)

Note: Total change in wage inequality is a sum of contributions from four factors. Numbers in parentheses are percentage contributions. Standard Deviation (SD) and Gini coefficient are multiplied by 100 so changes are read in percentage points. For wage gaps, 90-75 is ($ln\ P90 - ln\ P75$) x 100 where $P90$ is (non-log) wage in the 90^{th} percentile, so it is a percentage difference between $P90$ and $P75$. Change in 90-75 is read in percentage points. For example, change in 90-75 of 14.8 means that the percentage difference between $P90$ and $P75$ increases by 14.8 percentage points.

Period 3 (2011-2023): CFM decomposition

	(1)	(2)	(3)	(4)	(5)
Measure	Total change	Change due to			
		MW	Edu	Lab.Comp	Price
90-75	-28.1	0 (0.0)	-9.4 (-33.5)	8 (28.5)	-26.7 (-95.1)
90-50	-31.5	0 (0.0)	0.7 (2.3)	7.6 (24.2)	-39.8 (-126.5)
90-25	-31.3	-20.2 (-64.4)	2.8 (9.1)	2.3 (7.3)	-16.3 (-52.0)
75-50	-3.4	0 (0.0)	10.1 (299.0)	-0.4 (-12.0)	-13.1 (-387.0)
75-25	-3.2	-20.2 (-632.2)	12.3 (384.3)	-5.7 (-180.2)	10.5 (328.1)
50-25	0.2	-20.2 (-10086.9)	2.1 (1061.7)	-5.3 (-2672.4)	23.6 (11797.5)
25-10	3.5	-13.5 (-391.4)	2 (58.0)	5.3 (153.7)	9.7 (279.8)
SD	-12	-7.5 (-61.9)	1.9 (15.5)	-0.7 (-6.0)	-5.7 (-47.6)
Gini	-1.3	-1 (-75.7)	0.2 (14.6)	-0.1 (-10.3)	-0.4 (-28.6)

Note: Total change in wage inequality is a sum of contributions from four factors. Numbers in parentheses are percentage contributions. Standard Deviation (SD) and Gini coefficient are multiplied by 100 so changes are read in percentage points. For wage gaps, 90-75 is ($ln\ P90 - ln\ P75$) x 100 where $P90$ is (non-log) wage in the 90^{th} percentile, so it is a percentage difference between $P90$ and $P75$. Change in 90-75 is read in percentage points. For example, change in 90-75 of 14.8 means that the percentage difference between $P90$ and $P75$ increases by 14.8 percentage points.

Accounting for spillover effect of MW in 2011-2023

Measure	(1) Total change	(2) Change due to minimum wage	(3) Change due to minimum wage
		Without spillover	With spillover
90-75	-16.6	-0.7 (-4.2)	-0.6 (-3.9)
90-50	-31.2	-1.3 (-4.1)	-1.2 (-3.7)
90-25	-34.6	-5.1 (-14.6)	-6.0 (-17.4)
75-50	-14.6	-0.6 (-4.0)	-0.5 (-3.6)
75-25	-17.9	-4.4 (-24.3)	-5.4 (-30.0)
50-25	-3.4	-3.8 (-112.7)	-4.8 (-144.6)
25-10	-2.0	-25.3 (-1271.4)	-24.9 (-98.7)
SD	-15.1	-5.8 (-38.5)	-6.0 (-40.1)
Gini	-1.5	-0.7 (-43.3)	-0.7 (-45.1)

Note: Total change in wage inequality is a sum of contributions from four factors. Numbers in parentheses are percentage contributions. Standard Deviation (SD) and Gini coefficient are multiplied by 100 so changes are read in percentage points. For wage gaps, 90-75 is ($ln\ P90 - ln\ P75$) x 100 where $P90$ is (non-log) wage in the 90^{th} percentile, so it is a percentage difference between $P90$ and $P75$. Change in 90-75 is read in percentage points. For example, change in 90-75 of 14.8 means that the percentage difference between $P90$ and $P75$ increases by 14.8 percentage points.

What happens when MW changes?

- The FLL method allows us to estimate the movement of workers when MW is introduced.
- In the absence of MW, the fraction of workers who would have earned less than MW (FA) is 20.3%.
- When MW is introduced, among those FA, 68.2% would still earn wages below MW. 29.9% would earn exactly at MW and 2% would earn above MW.

	FA	Staying below MW (δ_0)	Moving at MW (δ_1)	Staying beyond MW (δ_2)	Fraction of MW workers moving up (δ_3)
Simple measurement model	0.203	0.682	0.298	0.020	
Rank preservation model	0.203	0.682	0.318	0.000	0.043

- An increase in MW can lead to a decline in inequality as wages of those moving at MW (δ_1) get closer to the better-off and become more similar.

Conclusion

- The dynamics of wage inequality can be shaped by a host of factors which can operate in opposing directions.
- Over nearly four decades, the decline in wage inequality in Thailand is primarily driven by the increase in minimum wage. Since 1997, the changing wage structure has also been a contributor to such decline. On the other hand, higher educational attainment is inequality-enhancing.
- Implication for
  - Research: the need for casual analysis of factors shaping wage inequality such as technology or trade.
  - Policy: While an increase in minimum wage can cause a decline in wage inequality, policy to promote equality of opportunity and outcome goes much beyond minimum wage.

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