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Labor Market Sorting in Taiwan

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This study provides the first bias-corrected estimates of labor market sorting in Asia using the Abowd, Kramarz, and Margolis (1999) model on an administrative employer-employee dataset from Taiwan. Findings reveal that the contributions of individual, firm, and sorting components to wage variation align closely with estimates from Europe and the United States: individual effects explain 60% of wage variance, firm effects 14%, and sorting effects 13.5%. Notably, the sorting component has increased from 7.2% to 13.5% over the past 15 years, paralleling trends in similarly developed economies despite structural and industrial differences. A unique aspect of Taiwan has been that, despite increasing sorting, wage inequality remains relatively stable, in contrast to findings in other contexts, such as Card, Heining, and Kline (2013).

Keywords: Labor Market Sorting, Inequality
JEL classification: J31, J40

1 Introduction

Do high-wage workers work for high-wage firms? How much does where you work determine what you earn? These questions lie at the core of un-

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derstanding labor market inequality and have been a focus of research since the pioneering work of Abowd, Kramarz, and Margolis (1999), hereafter referred to as AKM. A large and growing body of literature has since explored the roles of workers, firms, and sorting in determining wage disparities. However, much of the existing research has focused on Western contexts, primarily the United States and Europe, leaving significant gaps in our understanding of these dynamics in other parts of the world. While recent studies, such as those by Kline, Saggio, and Sølvsten (2020) and Bonhomme et al. (2023), have introduced bias corrections to address limitations in the original AKM model, these efforts have also remained largely confined to Western labor markets.

This study aims to fill this gap in the literature by providing bias-corrected labor market sorting estimates for Taiwan, using comprehensive administrative tax data. To the best of our knowledge, this is the first estimate with comprehensive administrative records in Asia.[1] The East Asian labor market context is particularly interesting due to its unique characteristics, which include rapid economic growth, stable employee-employer relationships, and distinct labor practices such as limited union power. These factors, often cited as contributors to the so-called "East Asian Economic Miracle" (Birdsall et al., 1993), suggest that the dynamics of worker-firm sorting and wage determination in Taiwan might differ substantially from those observed in Western economies. Despite the importance of these dynamics, there have been few attempts to estimate them rigorously in East Asian economies using the latest econometric approaches.

To address this gap, we use matched employer-employee tax data from the Taiwanese Fiscal Information Agency, spanning from 2005 to 2020. The dataset, constructed by linking household and income registries, offers a longitudinal view of workers and firms in Taiwan, enabling a detailed examination of wage variation and the contributions of worker, firm, and sorting effects. The analysis employs the AKM framework, with bias corrections as described by Bonhomme et al. (2023), allowing for an accurate decomposition of wage variance into individual, firm, and sorting components.

A series of validation exercises suggests that our Taiwanese data exhibit features broadly consistent with the AKM model, though with some de-

[1] An attempt using Taiwanese data is an unpublished manuscript by Hsieh (2021). He also uses the Taiwanese tax data, but he does not perform bias correction to the AKM framework.

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viations. For example, the event study results show relatively stable wage trends prior to job transitions, and wage changes are approximately symmetric in direction and magnitude, although pre-transition trends are not entirely flat. Additionally, the pattern of mean residuals provides informal support for the additive separability of worker and firm effects. While these patterns are not perfectly aligned with the model's assumptions, they are broadly similar to those found in prior administrative data studies. Following standard practice, we interpret the AKM framework primarily as a reduced-form statistical decomposition tool, useful for characterizing wage structures and worker-firm sorting, rather than as a fully structural model.

The analysis reveals that individual effects account for approximately 60% of the wage variation, emphasizing the importance of worker-specific characteristics. Firm effects contribute 14%, while sorting between workers and firms accounts for 13.51% of the variance, highlighting the role of matching in determining earnings. Notably, bias corrections significantly influence sorting estimates, nearly doubling their magnitude compared to uncorrected values. Over the past 15 years, the share of sorting has increased from 7.17% to 13.51%, while the residual component has declined, suggesting better worker-firm matching over time.

The share of each component and the decomposition in Taiwan is remarkably similar to many European countries and the United States. The increasing trend of the share of sorting is also consistent with patterns seen in West Germany and the United States. This is particularly remarkable as the estimates in this study are the first to the best of our knowledge in the Asian context. This suggests that despite all the differences in norms or structure in these countries, the labor market sorting still exhibits similar features.

A notable divergence from previous literature is the relatively stable inequality in labor income within Taiwan, which does not increase alongside the rising sorting component as observed in West Germany and the United States. This finding suggests that higher sorting does not necessarily correlate with increased wage inequality.

Overall, this study provides the first bias-corrected evidence of labor market sorting in Taiwan and contributes to the broader literature by offering insights into how East Asian labor markets differ from their Western counterparts. The findings underscore the importance of contextual factors in shaping labor market dynamics and highlight the need for further research into the unique labor market institutions and practices in East Asia, which may influence sorting behavior and wage determination. The findings also

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urge caution when interpreting the link between the rising sorting component and inequality in the labor market, as in the Taiwanese case these do not go hand-in-hand.

2 Literature

Understanding how wages are determined and why they differ across individuals and firms has long been a central question in labor economics. A large literature has sought to disentangle the respective contributions of worker characteristics, firm pay-setting policies, and the sorting of workers to firms. A major breakthrough in this effort came with the work of Abowd, Kramarz, and Margolis (1999), who developed a statistical framework — commonly known as the AKM model — to decompose log earnings into additive worker and firm fixed effects, along with observable covariates and an idiosyncratic error term. Using matched employer-employee data, the AKM model enables researchers to estimate how much of the variation in earnings is attributable to individual-specific skills, firm-specific wage policies, and the extent to which high-wage workers match with high-wage firms.

Over the past two decades, the AKM framework has been widely adopted in high-income countries to analyze wage inequality. Card et al. (2018) provide a comprehensive review of this literature and summarize two key empirical findings: (1) firm effects typically account for about 20% of wage variance, underscoring the role of employers in shaping wage outcomes; and (2) the correlation between worker and firm effects — i.e., sorting — is often small in levels but has been increasing over time in countries like Germany (Card, Heining, and Kline, 2013) and the United States (Song et al., 2019), suggesting that sorting is a growing source of inequality. Importantly, these findings suggest that wage-setting practices are not only a function of market-wide skill prices but also reflect firm-specific choices and frictions.

These insights have broader economic implications. First, labor market sorting has direct consequences for aggregate productivity. If more productive workers are increasingly concentrated in more productive firms, this can improve allocative efficiency and raise economy-wide output (Eeckhout and Kircher, 2011). Conversely, barriers to sorting — such as rigidities in mobility or informational frictions — can lead to misallocation of talent. Second, the degree of firm influence on wages reflects the nature of labor market competition. Models of monopsony or search frictions imply that wage dispersion may persist even among observationally identical workers

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(Manning, 2011), and that firm wage-setting power can limit worker mobility and suppress wage growth. Finally, these dynamics are highly relevant for public policy. Understanding whether inequality stems primarily from individual differences, firm practices, or sorting informs the design of redistributive policies, minimum wage legislation, or interventions aimed at improving job matching.

Bonhomme et al. (2023) further advance the AKM literature by addressing methodological limitations in estimating worker and firm effects. They highlight a key problem in empirical implementation — *limited mobility bias* — which arises because firm effects are identified from the wages of workers who switch employers. When worker mobility across firms is sparse or uneven, the fixed effects estimator can overstate the contribution of firm effects to wage dispersion and understate the importance of sorting. While this issue has long been acknowledged (Abowd et al., 2004; Andrews et al., 2008), bias-correction methods have only recently been operationalized for large-scale datasets (Kline, Saggio, and Sølvsten, 2020). Bonhomme et al. (2023) implement both fixed effects and correlated random effects estimators to correct for this bias and find that sorting plays a much larger role in earnings inequality than previously estimated in many Western countries.

Despite these advances, most of the literature has concentrated on the United States and a handful of European economies with relatively flexible labor markets and rich administrative data. Very few studies have applied the AKM framework — especially with bias correction — to settings outside of these developed contexts. One notable exception is Bassier (2023), who analyzes matched employer–employee data from South Africa. However, broader evidence from other regions remains scarce.

This study contributes to filling that gap by applying bias-corrected AKM estimators to Taiwan, marking one of the first such efforts in an East Asian context. Including evidence from Taiwan expands the geographic scope of the literature and helps assess whether the patterns of firm effects and sorting documented in Western economies generalize to labor markets with distinct institutional features. Broadening the empirical base in this way is essential for building a more comprehensive understanding of wage inequality and firm-worker matching across different economic systems.

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3 Data

We use administrative tax data from the Taiwanese Fiscal Information Agency (FIA), which serves as Taiwan's equivalent of the Internal Revenue Service (IRS) in the United States. The dataset is created by merging the Household Registry (JHQH file) with the Income Registry (IIMH file). The Household Registry contains individual identifiers, dates of birth, and other basic demographic information for the entire population. The Income Registry includes information on all taxable income, regardless of whether taxes were ultimately paid. Specifically, it records the individual's ID, the source ID (firm ID) of the income, the amount paid, and whether the payment constitutes labor earnings. By linking individuals and firms through these identifiers, we create a longitudinal employer-employee matched dataset that spans from 2005 to 2020.

Consistent with Song et al. (2019), the definition of a firm used in this study corresponds to a unique firm ID in the tax data. Officially, this identifier is called the Business Administrative Number (BAN), which is the entity through which a business files taxes.

Since the data originate from administrative tax records, income generated in the informal sector is not observed. Previous estimates of the size of Taiwan's informal economy vary, but the literature indicates that it is comparable in magnitude to that of OECD countries and appears to be declining over time (Chu and Chu, 1988; Dai, 2007; Lin and Hung, 2019). This limitation is important to consider when interpreting the findings, as individuals engaged solely in the informal sector are not represented.[2]

To ensure international comparability, we follow the sample construction approach described in Bonhomme et al. (2023). The analysis focuses on the employer associated with the highest annual earnings for each worker. The sample is restricted to individuals employed in the private sector and those between the ages of 25 and 60.

[2]A declining underground economy may also affect the estimation of firm effects. If underreporting was historically concentrated among low-wage firms that are now more fully captured in the tax data, this could lead to either a decline or an increase in the estimated dispersion of firm effects over time, depending on the distribution of the added firms. Adding mass to the lower tail of the firm distribution could increase variance by widening the distribution; however, if the added firms are tightly clustered and exhibit relatively low within-group variance, the overall dispersion may decline. The latter scenario appears more consistent with our data, which show a modest decrease in the variance of firm effects over time.

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For workers receiving income from multiple employers, we retain only the employer that provides the highest income. The sample is also restricted to full-time equivalent (FTE) workers. As the dataset does not include information on hours worked, we define an individual as an FTE worker if their annual earnings exceed the annualized minimum wage. In Taiwan, the minimum wage typically corresponds to approximately 45% of the national mean wage.[3] The incidence of part-time employment in Taiwan is significantly lower compared to the United States.[4] No restrictions are imposed on firm size in the sample selection. After applying these criteria, the final dataset includes approximately 4.8 million workers per year.

To facilitate international comparison, we structure the dataset into 6-year periods. This approach allows for arbitrary serial correlation among employment spells by collapsing the data into 6-year spells for each individual. Such an approach provides a consistent basis for analyzing trends over time and comparing them across countries.

4 Method and Validation

Following Abowd, Kramarz, and Margolis (1999), the original AKM model is specified as follows:

$$Y_{it} = X'_{it}\beta + \alpha_i + \psi_{j(i,t)} + \epsilon_{it}, \tag{1}$$

where Y_{it} represents the log earnings of worker i in year t, X_{it} includes observable covariates such as age and calendar time, α_i captures the unobserved worker effect, $j(i,t)$ represents the firm that worker i is employed in during year t, $\psi_{j(i,t)}$ denotes the unobserved firm effect, and ϵ_{it} is the idiosyncratic error term.

As in Abowd, Kramarz, and Margolis (1999), it is assumed that the model is correctly specified. Specifically, the log earnings are assumed to be additively separable in worker and firm effects, thus ruling out potential interaction effects between the two. Furthermore, the idiosyncratic error term ϵ_{it} is assumed to be mean independent of observable covariates, worker and firm effects, and firm identities across individuals and over time. For i

[3] As of 2023, the minimum wage was NTD 26,400 per month, and the mean monthly wage was NTD 58,761 (including bonuses).

[4] As of 2023, part-time workers accounted for 3.98% of all workers in Taiwan, user according to the Ministry of Labor (2023).

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in 1 to N, j in 1 to J, and t in 1 to T, the mean independence assumption can be expressed as:

$$E\left[\epsilon_{it}|X_{11},\cdots,X_{NT},j(1,1),\cdots,j(N,T),\alpha_1,\cdots,\alpha_N,\right.$$
$$\left.\psi_1,\cdots,\psi_J\right]=0. \tag{2}$$

To quantify the contributions of worker, firm, and sorting effects to the overall variance in earnings, the following variance decomposition is performed:

$$\mathrm{Var}\left(Y_{it}-X_{it}'\beta\right)= \underbrace{\mathrm{Var}(\alpha_i)}_{\text{Individual Effect}}+\underbrace{\mathrm{Var}(\psi_{j(i,t)})}_{\text{Firm Effect}}+\underbrace{2\mathrm{Cov}(\alpha_i,\psi_{j(i,t)})}_{\text{Sorting Effect}}$$
$$+\mathrm{Var}(\epsilon_{it}). \tag{3}$$

The decomposition highlights the share of variance attributed to worker heterogeneity (individual effect), firm-specific factors (firm effect), and the sorting between workers and firms. The covariates X_{it} include year fixed effects and age profile variables. The age profile follows Card, Heining, and Kline (2013) and is modeled as a third-order polynomial that is flat at age 40 to account for non-linear wage growth patterns.[5]

A well-documented limitation of the AKM model is the issue of limited mobility bias. Since the model is identified primarily through individuals who change employers ("movers"), a small number of such movers can lead to biased sorting estimates. To address this issue, the bias correction approach from Bonhomme et al. (2023) is employed. Specifically, following Andrews et al. (2008), a homoskedastic bias correction is applied, correcting the bias in the variance estimates under the assumption that the error term has constant variance.

5 Empirical Findings

5.1 Summary Statistics

Table 1 presents the summary statistics for the sample period 2010 to 2015. We illustrate using this sample period to allow for a comparison with the

[5] To address a potential concern that Taiwanese firms may place greater value on seniority, we also tested an alternative specification where the age profile is flat at age 50. The results remain virtually unchanged, suggesting that our findings are not sensitive to this modeling choice.

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Table 1: Sample Characteristics

	Taiwan		
Set:	FS	CS	LOOS
Baseline years		2010–2015	
Sample counts (1,000):			
Unique firms	477.953	258.857	159.161
Share of full set (%)	100.000	54.160	33.301
Unique workers	4,769.333	3,471.806	3,238.892
Share of full set (%)	100.000	72.794	67.911
Distribution of moves:			
Moves per firm	5.598	10.191	15.261
Worker-weighted quantiles:			
10th quantile	1	3	4
50th quantile	28	49	60
90th quantile	1,027.058	1,356.956	1,469.609
Log earnings distribution:			
Variance	0.347	0.348	0.348
Between-firm share (%)	50.276	46.892	44.907

Notes: The table is constructed using data from the Taiwanese Fiscal Information Agency (FIA). The sample is restricted to full-time workers aged between 25 and 60 employed in the private sector. "FS" denotes the full sample, "CS" denotes the largest connected set, and "LOOS" denotes the leave-one-out set. Earnings are reported in New Taiwan Dollars (NTD, approximately 0.03 USD).

existing literature. The summary statistics for other periods are presented in Appendix Section A. Following Bonhomme et al. (2023), the table includes the full sample, the connected set, and the leave-one-out set. The connected set is constructed as the largest component where firms are linked by at least one worker who moves between them. The leave-one-out set is further restricted to firms that remain connected even if any given worker is removed. These sets are used to construct the bias-corrected estimates, providing robustness against limited mobility bias.

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The degree of firm connectivity in Taiwan is comparable to that observed in other countries analyzed in Bonhomme et al. (2023). The dataset includes approximately 478 thousand unique firms in the full sample. The connected set represents about half of the firms, while the leave-one-out set retains one-third of the original firms.

In terms of worker connectivity, an interesting feature of the Taiwanese labor market is that many workers do not belong to the connected or leave-one-out sets. In contrast, in other countries studied by Bonhomme et al. (2023), the connected set typically contains at least 93% of workers from the full sample. One possible explanation for this difference is the lower mobility of workers in Taiwan. Indeed, the 10th percentile of the number of job changes in the full sample is only one, indicating that a substantial share of firms have very few employee moves. In contrast, firms included in the connected set tend to exhibit significantly more worker mobility, with the average number of job changes being almost twice as large as in the full sample.

Finally, the between-firm share of variance in the log earnings distribution, which captures firm effects or the composition of workers, is slightly higher in Taiwan. Bonhomme et al. (2023) report between-firm variance shares ranging from 30% to 45% in other countries.

5.2 Method Validation

In addition to potential bias arising from limited worker mobility, the AKM model imposes several restrictions on the data-generating process, including assumptions of exogenous mobility and additive separability. Before presenting the main results, we discuss two validation exercises that examine the plausibility of both the exogenous mobility and additive separability assumptions.

First, the exogenous mobility assumption is tested. According to this assumption, if workers move across firms in a manner independent of match-specific components, wages should reflect the average firm effect of the new employer. Specifically, workers who move to firms with lower-paying coworkers should experience wage cuts, while those moving to firms with higher-paying coworkers should see wage increases. In contrast, if mobility is endogenous, workers will systematically move to firms that provide better matches, regardless of average wages.

Following Card, Heining, and Kline (2013), we conduct an event study

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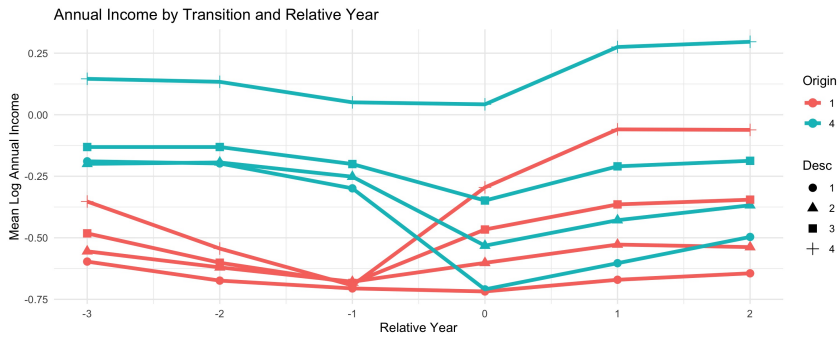


Figure 1: Wage Profiles of Movers by Firm Co-Worker Wage Quartiles

Notes: The figure shows mean wages for workers who changed jobs between 2010 and 2015. Relative year 0 represents the year of the move. Jobs are divided into quartiles based on the mean log wage of coworkers in the firm. Only the first and fourth quartiles prior to the moves are shown.

in Figure 1, depicting average earnings before and after a job change. If the AKM structure in Equation 1 holds, earnings should exhibit symmetric changes, and there should be relatively stable trends in earnings prior to the move, without evidence of wage cuts driving mobility decisions.

As shown in Figure 1, wage trends are relatively stable before job changes, and workers switching firms exhibit patterns consistent with the AKM framework: those moving from lower-paying to higher-paying firms experience wage gains, while those moving in the opposite direction experience wage losses. Except for the most extreme case — where a worker moves from the lowest-paying to the highest-paying firm — the trends remain broadly parallel. This provides suggestive support for the exogenous mobility assumption.

We also assess the additivity assumption by comparing wage changes for upward and downward movers. Figure 2 plots these changes across firm wage quartiles. The data points align closely with the negative 45-degree line, indicating that the wage changes are approximately symmetric in magnitude and opposite in sign. While not perfectly symmetric, the pattern is broadly consistent with the additive structure of the AKM model.

To test additive separability, we follow Card, Heining, and Kline (2013) and examine the mean residuals from the estimated two-way fixed effects model. Figure 3 shows residual means across deciles of estimated worker

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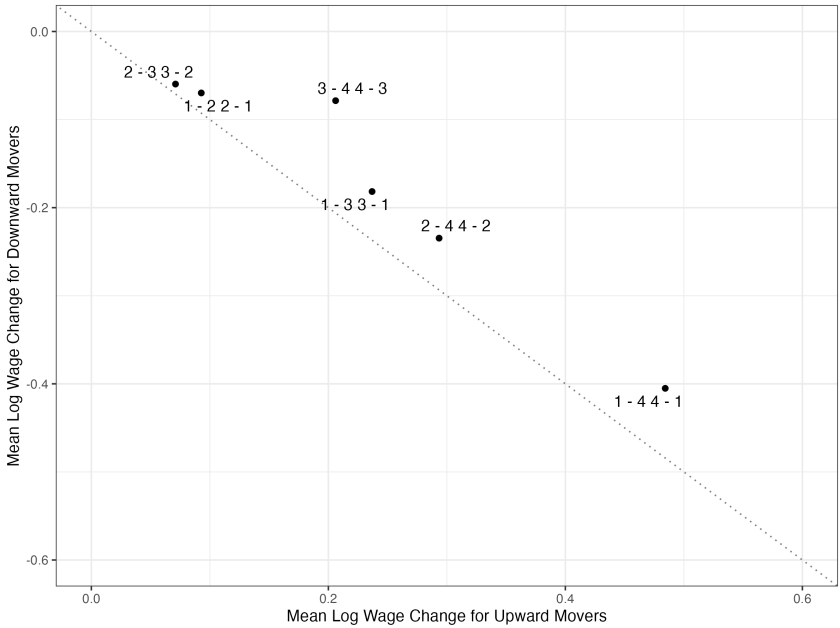


Figure 2: Test of Symmetry of Wage Changes

Notes: The figure plots the wage changes of movers across coworker wage quartiles. The wages are regression-adjusted. The sample used is the 6-year panel from 2010 to 2015. The point labeled "2–3 3–2" represents the upward wage change for workers moving from second quartile firms to third quartile firms and the downward wage change for workers moving from third quartile firms to second quartile firms.

and firm effects. Under additive separability, these means should be close to zero. Reassuringly, the residuals are generally small, with slightly larger deviations concentrated among the lowest worker decile — possibly due to minimum wage effects, as observed in prior work.

While the patterns in these diagnostic figures are not perfectly consistent with the AKM assumptions — e.g., wage trends are not completely flat before transitions, and points in the additivity check lie slightly above the negative 45-degree line — we interpret these deviations as modest. Following standard practice in the literature, we view these visual diagnostics as informal checks of model fit. Our results are broadly in line with those

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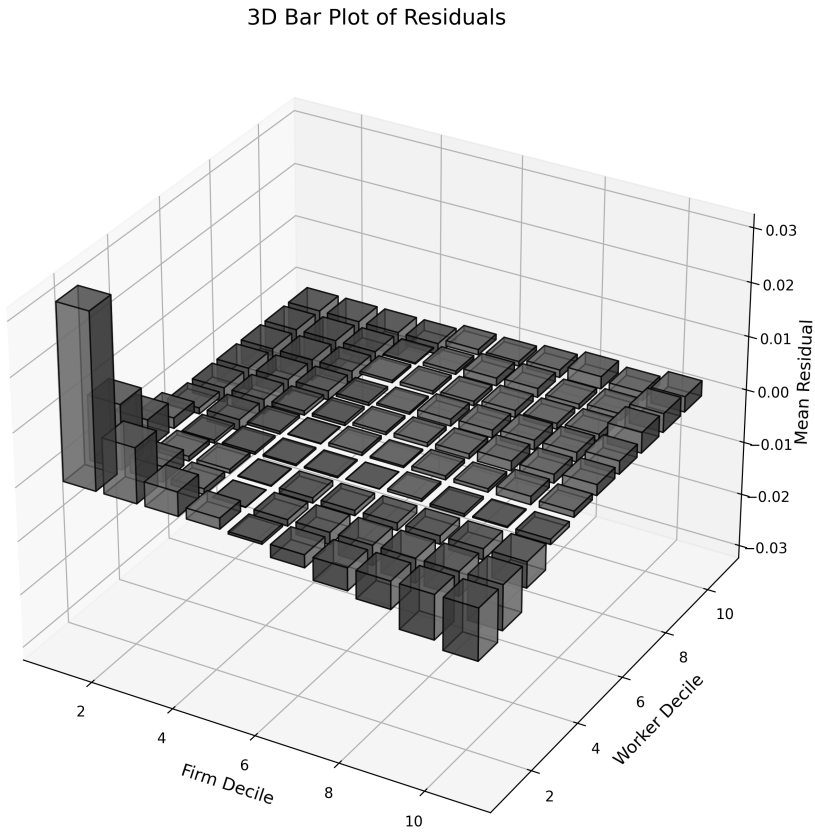


Figure 3: Mean Residuals by Firm and Worker Effect Deciles

Notes: The figure plots the mean residuals of the estimated Equation 1. The cells are defined by deciles of estimated firm and worker fixed effects. The estimating sample is the 2010–2015 panel.

in previous studies using administrative data, and we treat the AKM model primarily as a reduced-form statistical decomposition tool rather than a fully structural model. As such, we focus on the AKM framework for its usefulness in providing comparable wage structure estimates across countries.

That said, we acknowledge that recent work, such as Lamadon, Mogstad, and Setzler (2022), has begun to develop richer structural models that relax AKM assumptions — such as symmetry and additivity — in order to bet-

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Table 2: Decomposition Results

Item	2005–2010	(%)	2010–2015	(%)	2015–2020	(%)
Var(LnWage)	0.350	100.000	0.348	100.000	0.339	100.000
Var(Firm FE)	0.064	18.325	0.048	13.879	0.048	14.280
Var(Worker FE)	0.205	58.502	0.206	59.180	0.209	61.752
2xCov(Firm,Worker)	0.025	7.172	0.041	11.735	0.046	13.514
Other	0.006	1.714	0.009	2.581	0.003	0.830
Residual	0.050	14.287	0.044	12.624	0.033	9.624

Notes: Variance is calculated using bias-corrected estimates from Equation 1 on the connected sample for each time period. "Other" includes age-related covariates and their covariance with other variables.

ter capture wage dynamics and sorting mechanisms. We see these models as promising directions for future research, especially in contexts where the AKM assumptions may be more tenuous.

5.3 Main Results

The main results are presented in Table 2. The key specifications include bias-corrected variance and covariance estimates, along with their share of the total variance over time.

In the sample period of 2015–2020, the individual effect explains approximately 60% of the variation in wages, indicating that a significant proportion of earnings variation is driven by worker-specific characteristics. The contribution of firm effects is smaller but still noteworthy, accounting for 14% of the variance in the most recent period. Sorting effects, representing the matching between workers and firms, account for 13.51% of the variance. The other covariates, including age and its interactions, explain only a minor portion of the variance. Overall, the AKM model provides a good fit to the data, with residual terms accounting for only 9.62% of the total variance.

As discussed in Section 4, limited mobility bias can significantly affect the AKM estimates when bias correction is not applied. This is evident in the sorting estimates, which are biased downward in the absence of correction. In Appendix Table 5, the sorting estimate is approximately half of the

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bias-corrected value, emphasizing the importance of applying these corrections to avoid underestimating the role of sorting in earnings variation.

Over the past 15 years, the total variance of log wages has remained remarkably stable, with a slight decrease, averaging around 0.35. This stability contrasts with findings for West Germany and the United States, where the variance of log wages increased from 0.884 to 0.924 between the 2001–2007 and 2007–2013 periods (Card, Heining, and Kline, 2013; Song et al., 2019). The stability of earnings distribution in Taiwan has also been documented in Chen et al. (2024). A potential reason for this stability could be the substantial increase in the minimum wage over this period.[6]

The decomposition of wage variation reveals that the share attributable to individual fixed effects has remained largely stable over time. However, an interesting trend is the increase in the sorting component, which rose from 7.17% to 13.51%, while the residual share decreased from 14.29% to 9.62%. One potential explanation is that better matching between workers and firms has occurred over time, potentially due to improvements in labor market technology and a reduction in frictions, such as through the increased use of online job-matching platforms (Eeckhout, 2018; Lopes de Melo, 2018). This view is consistent with the implication of a search model and assortative matching between workers and firms (Borovicková and Shimer, 2024). As sorting improves, a larger share of wage variation becomes explained by the systematic pairing of workers and firms, leaving a smaller share to be captured by the residual component. Thus, the decline in the residual share may itself reflect increased labor market efficiency driven by technological change.

While the overall level of wage inequality in Taiwan has remained low and stable, this is particularly striking given the country's significant structural transformation in recent decades — especially a shift from manufactur-

[6]Minimum wage increases may also have contributed to the rise in sorting. We find a strong positive time-series correlation (coefficient = 0.8268) between the minimum wage level and the estimated sorting component in our data. One potential explanation is that higher minimum wages may induce firms to become more selective in hiring, increasing the degree of assortative matching between workers and firms. However, this is only a hypothesis; in contrast, Dustmann et al. (2022) find that the introduction of a minimum wage in Germany reduced assortative matching by reallocating low-wage workers to higher-wage firms. Our observed correlation is suggestive but not necessarily causal, and a careful investigation of the mechanisms behind this relationship in Taiwan is beyond the scope of this paper and left for future research.

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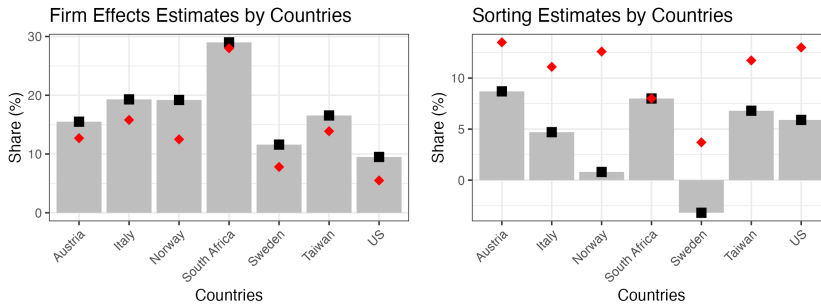


Figure 4: Firm Effects and Sorting Across Countries

Notes: The black dots are the uncorrected AKM estimates, while the red dots are the bias-corrected estimates. Estimates for Austria, Italy, Norway, Sweden, and the United States are taken from Bonhomme et al. (2023). Estimates for South Africa are from Bassier (2023). Estimates for Taiwan are calculated by the authors. The estimates are derived from the connected set of firms within each country for 6-year panels. Bias-corrected estimates are obtained using the homoskedastic method, except for South Africa, which uses the heteroskedastic method developed by Kline, Saggio, and Sølvsten (2020).

ing toward services. That such a reallocation of labor has occurred without a corresponding rise in inequality suggests that institutional or policy factors — such as centralized education or wage-setting mechanisms — may play an equalizing role. A deeper industry-level analysis is beyond the scope of this paper, but we highlight this as an important direction for future research.

Despite the stability of total variance, the trend of an increasing sorting share and a decreasing residual component is similar to that observed in West Germany and the United States (Card, Heining, and Kline, 2013; Song et al., 2019). This trend may be indicative of structural changes in the labor market, such as improved matching technologies and reduced search frictions. Our findings also suggest that greater sorting does not necessarily lead to increased wage inequality.

To further contextualize the findings, we compare the estimates for Taiwan with those from other countries, including the United States, Austria, Italy, and Norway, as reported by Bonhomme et al. (2023) and Bassier (2023). Figure 4 shows the firm effect components and sorting estimates

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across countries. The estimates for Taiwan are quite similar to those for the United States, Austria, Italy, and Norway, with the share of firm effects less than 20% and sorting between 10% and 15%. In contrast, South Africa exhibits significantly higher variability, possibly due to differences in economic development, labor market competitiveness, and unemployment rates. Notably, Taiwan's unemployment rate (3.78% in 2015) is much lower than that of South Africa (25.3% in 2015), which may explain some of the observed differences.[7]

What makes Taiwan particularly interesting is that, despite its distinct institutional context — such as low unionization, limited collective bargaining, and a unique developmental trajectory — it exhibits decomposition patterns that closely mirror those of advanced Western economies. This alignment suggests a striking degree of robustness in AKM-style decompositions across diverse labor market structures. In this sense, Taiwan serves not only as a new data point from East Asia, but also as a compelling case in support of the external validity of findings from the AKM literature.

6 Conclusion

Using administrative employer-employee matched data provided by the Taiwanese tax agency, this study presents the first bias-corrected labor market sorting estimates based on the AKM model in Asia. The analysis reveals that wage variation in Taiwan remained remarkably stable from 2005 to 2020. The contributions of individual fixed effects, firm fixed effects, and sorting to wage variation are strikingly similar to those observed in European countries and the United States. Consistent with existing literature, the share attributable to sorting has almost doubled, while the share of AKM residuals has decreased significantly over the 15-year period. These findings provide a benchmark for understanding labor market sorting in an Asian context, contributing to the broader literature on labor economics.

[7] Consistent with this interpretation, we find a negative time-series correlation of −0.2791 between the variance of firm effects and the national unemployment rate in Taiwan.

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A Additional Summary Statistics

We present additional summary statistics in Table 3 and 4.

Table 3 Summary Statistics (2005–2010)

	Taiwan		
Set:	FS	CS	LOOS
Baseline years		2005–2010	
Sample counts (1,000):			
Unique firms	408.971	213.687	126.366
Share of full set (%)	100.000	52.250	30.899
Unique workers	3,886.696	2,626.362	2,399.509
Share of full set (%)	100.000	67.573	61.736
Distribution of moves:			
Moves per firm	4.423	8.248	12.465
Worker-weighted quantiles:			
10th quantile	1	2	4
50th quantile	18	31	40
90th quantile	596.952	768.000	897.869
Log earnings distribution:			
Variance	0.350	0.350	0.345
Between-firm share (%)	51.239	47.265	44.696

Notes: The table is constructed using data from the Taiwanese Fiscal Information Agency (FIA). The sample is restricted to full-time workers aged between 25 and 60 employed in the private sector. "FS" denotes the full sample, "CS" denotes the largest connected set, and "LOOS" denotes the leave-one-out set. Earnings are reported in New Taiwan Dollars (NTD, approximately 0.03 USD).

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Table 4 Summary Statistics (2015–2020)

	Taiwan		
Set:	FS	CS	LOOS
Baseline years		2015–2020	
Sample counts (1,000):			
Unique firms	449.202	239.551	141.099
Share of full set (%)	100.000	53.328	31.411
Unique workers	4,554.472	3,491.557	3,241.868
Share of full set (%)	100.000	76.662	71.180
Distribution of moves:			
Moves per firm	4.933	9.065	13.927
Worker-weighted quantiles:			
10th quantile	1	3	4
50th quantile	30	48	59
90th quantile	1,062.000	1,372.423	1,452.943
Log earnings distribution:			
Variance	0.335	0.339	0.340
Between-firm share (%)	53.319	50.246	48.074

Notes: The table is constructed using data from the Taiwanese Fiscal Information Agency (FIA). The sample is restricted to full-time workers aged between 25 and 60 employed in the private sector. "FS" denotes the full sample, "CS" denotes the largest connected set, and "LOOS" denotes the leave-one-out set. Earnings are reported in New Taiwan Dollars (NTD, approximately 0.03 USD).

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B Decomposition Results without Bias Correction

We present the decomposition results without bias-correction in Table 5.

Table 5 Decomposition Results (Without Bias-Correction)

	2005–2010		2010–2015		2015–2020	
Item		(%)		(%)		(%)
Var(LnWage)	0.350	100.000	0.348	100.000	0.339	100.000
Var(Firm FE)	0.080	22.838	0.058	16.559	0.056	16.569
Var(Worker FE)	0.234	66.796	0.224	64.478	0.224	66.095
2xCov(Firm,Worker)	−0.004	−1.200	0.024	6.800	0.031	9.237
Other	0.006	1.627	0.009	2.598	0.003	0.822
Residual	0.035	9.939	0.033	9.566	0.025	7.278

Notes: Variance is calculated using the estimates from Equation 1 on the connected sample for each time period. "Other" includes age-related covariates and their covariance with other variables.

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台灣勞動市場配對

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本研究首次利用 Abowd, Kramarz, and Margolis (1999) 模型, 結合台灣的行政雇主 — 雇員資料, 提供亞洲勞動市場配對 (sorting) 程度的估計。結果顯示, 個人、企業以及配對效果在工資差異的佔比, 與歐洲及美國的估計結果高度一致: 個人效果解釋了60%的工資變異, 企業效果佔14%, 而配對效果則為13.5%。配對效果在過去15年間由7.2%上升至13.5%, 與其他已開發經濟體的趨勢相似。台灣的一個獨特現象是, 儘管配對效果上升, 工資不平等仍相對穩定, 這與 Card, Heining, and Kline (2013) 的發現有所差異。

關鍵詞: 勞動市場配對, 不平等
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