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Does Industry Affiliation Influence Wages? Evidence from Indonesia and the Asian Financial Crisis

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Summary. — We exploit panel data and large, abrupt, and unusual dislocations of Indonesian workers in the wake of the Asian Financial Crisis to investigate the robustness and persistence of inter-industry wage differentials (IWDs). Unobserved worker characteristics explain 36% of IWDs. IWDs persist through the post-crisis decade, although, consistent with a rent-sharing explanation, they shift alongside sectors' terms of trade in the wake of the crisis. Agriculture pays a wage penalty, and manufacturing offers a statistically significant but small premium. Most IWDs do not seem to be driven by minimum wage laws, worker monitoring costs, the disagreeability of the work, job-specific skills, industry-specific human capital, nonwage benefits, or contracting terms.

JEL classification — J31, O15, J63
Key words — Inter-industry wage differential, Competitive labor market, Indonesia, Financial crisis, Employment

1. INTRODUCTION

There are strong regularities in inter-industry wage structures. Wages differ significantly across industries even after controlling for a wide range of observable worker characteristics. A typical finding is that an industry's wage premium correlates positively with its level of labor productivity, the education level of its workers, the length of its work-week, its nonwage to wage compensation ratio, unionization rate, mean firm size, concentration ratio, and level of profitability (e.g., Dickens & Katz, 1987). A standard result is that agriculture pays below average wages, while manufacturing and public utilities pay above average wages. These wage trends have been confirmed using data from developed and developing countries. Measured inter-industry wage differentials (IWDs) also appear to be remarkably stable over time, across countries, and across occupations (Abuhadba & Romaguera, 1993; Arbache, Dickerson, & Green, 2004; Erdil & Yetkiner, 2001; Gittleman & Wolff, 1993).

These regularities have fueled important debates. The fundamental issue is whether persistent measured wage differentials across industries can be reconciled with competitive labor markets. Wages in a competitive labor market should reflect a worker's opportunity cost of employment, so that, controlling for worker and job characteristics, they should not vary across industries. Such reconciliation is possible if more productive workers are sorted into higher paying industries on the strength of skills that are unobservable to the econometrician. Labor economists working with rich panel datasets from developed countries have brought increasingly sophisticated methods to bear on this question, seeking estimates of IWDs that are purged of selection biases (e.g., Gibbons, Katz, Lemieux, & Parent, 2005). Policy positions follow from an analyst's conclusion on this question. If high wages really are characteristics of industries, and not of the specific workers they employ, then IWDs can inform policies aimed at ensuring better and more equitably distributed employment opportunities.

All of these debates resonate deeply in developing countries, where the composition of employment is changing rapidly (Asian Development Bank, 2007a), inequality is ascendant (Asian Development Bank, 2007b), and there are serious debates over the effects of globalization on work and wages (Goldberg & Pavcnik, 2007; Rodrik, 1997). Indonesia provides an interesting setting for studying these issues because it has faced challenges that are similar to those facing other large developing countries, only magnified. With rising levels of relative inequality being translated by growth into ever larger absolute income disparities, and the manufacturing sector's share of employment stagnating even while wages rise and infrastructure constraints come to bind more tightly (Aswicahyono, Brooks, & Manning, 2011), Indonesia's labor market institutions have been transformed by a struggle over the distribution of gains from globalization (see Section 3). Two questions that have much to do with the existence and reasons for IWDs and arise in this context are: should countries seek better opportunities for workers through nonagricultural employment growth that is concentrated in manufacturing rather than services (The Economist, 2011); and if so, should they pursue this by making labor markets more flexible (Del Carpio, Nguyen, & Wang, 2012; Dhanani & Islam, 2004; Felipe & Hasan, 2006). Of course, how these different approaches to employment policy will alter wages depends at least partially on *why* wages differ across industries.

Unfortunately, evidence on the causes of IWDs in developing country labor markets is quite limited. Only one study of IWDs from a developing country employs panel data to control for worker identity. That study, from Brazil (Freguglia & Menezes-Filho, 2007), finds that correcting for worker identity reduces the magnitude of IWDs by 80%. Even that study, however, does not examine the sensitivity of these results to some commonly cited endogeneity problems (Gibbons *et al.*, 2005; Keane, 1993). Also, in contrast to these results from Brazil, every other developing country study we have found (see Section 2) provides circumstantial evidence from cross-sectional data suggesting that IWDs are driven by profit sharing, sociological considerations, and industry specific human

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capital. The empirical evidence is therefore incomplete and conflicting. Unfortunately, intuition provides no guidance either. The typical juxtaposition of large numbers of employees in informal employment with relatively strong institutional protections in the formal sector suggests that IWDs in developing countries may be driven by institutions rather than worker differences. On the other hand, wide variations in unmeasured education quality (Hanushek & Woessmann, 2007) suggest that observed differences in skills could play a role. What drives IWDs in developing countries therefore remains an open question.

We help to fill this gap, estimating IWDs with worker fixed effects (FEs) using a suitable panel dataset from Indonesia. Our data were collected over the decade following the Asian Financial Crisis, which had grave consequences for Indonesian labor markets. Massive, sudden bankruptcies led to wide job losses and an extremely unusual but well-distributed set of industry switches. These crisis-induced industry switches yield a large effective sample from which to estimate identity-corrected IWDs. They also open up the possibility of separating the sample into sets of industry switches that were arguably more and less likely to be endogenously selected, and of workers who were more and less likely to possess industry-specific human capital. We also ask whether previously documented crisis-driven changes in sector rents are reflected in shifts in IWDs. Detailed cross-sectional information on job, worker, and employer attributes permit us to assess whether IWDs shrink once we control for variables capturing worker monitoring costs, contract terms, worker skills, undesirable characteristics of jobs, and nonwage benefits. We ask whether IWDs are more pronounced in provinces paying higher minimum wages. Finally, we ask whether IWDs remained stable over the post-crisis decade, and whether they are correlated with IWDs before the crisis hit. We find that IWDs are mostly robust to attempts to reconcile them fully with competitive labor markets, correlated over time, responsive to shocks that altered the distribution of rents, but rather small.

The remainder of the paper proceeds as follows: Section 2 reviews literature on how IWDs have been interpreted in the development economics literature and why. Section 3 provides an overview of the crisis and other developments in Indonesian labor markets during the period of our study. Section 4 describes our main dataset. Section 5 presents our main estimates of IWDs with and without corrections for worker identity, Sections 6 and 7 test them for robustness to alternative explanations using panel and cross-sectional data respectively, and Section 8 discusses the implications of our findings.

2. IWDS IN DEVELOPING COUNTRIES AND IN DEVELOPMENT ECONOMICS

Industry wage differentials have been central to the debate over how wages are determined. Noncompetitive theories of the labor market attribute IWDs either to institutional rigidities, such as labor laws and collective bargaining, to "sociological" considerations or to the payment of above market efficiency wages. The sociological argument is that firms in some industries earn rents and choose to share them with workers in the interests of fairness or morale (Akerlof, 1984; Bewley, 1999). Efficiency wage arguments emphasize the incentive effects of high wages, positing that firms offer above market wages, inter alia, in order to reduce employee turnover or to induce workers to be industrious or loyal. Such wage inducements are required because monitoring workers to ensure these attributes and efforts is costly. Competitive theories, on the other hand, attribute IWDs to compensating differentials (some industries pay higher wages because employment in these industries is less agreeable, less stable, or more hazardous), accumulated industry-specific human capital, or a sorting of workers of different productivity levels across sectors. Because competitive theories involve no market failures, they are generally more supportive of a laissez faire approach to employment policy, while noncompetitive theories often admit the possibility that government interventions will enhance efficiency (Krueger & Summers, 1988).

As noted, only one study of IWDs from developing and newly industrialized economies was able to obtain panel data. The rest rely on a careful weighing of circumstantial evidence derived from cross-sectional data. These studies [1] have concluded that collective bargaining and industry-specific human capital have contributed to IWDs, but cannot account for them entirely. They find that turnover tends to be lower in high-wage sectors, and that wages are higher in large firms, consistent with the existence of efficiency wages intended to reduce turnover and ensure worker effort when monitoring costs are high. However, the strong correlation of IWDs across occupations is sometimes seen as evidence against both these and the compensating differentials theories of IWDs – after all, turnover, monitoring costs, and the disagreeableness of work presumably vary across occupations. The high correlation of IWDs across occupations has also been seen as evidence that unobservable worker differences in worker productivity do not explain them. Why, it is asked, should industries that require better managers and technical personnel also require better janitors? The emergent view is therefore that IWDs reflect some combination of rent-sharing undertaken to reinforce a sense of fairness, and industry-specific human capital.

This rent-sharing interpretation of IWDs forms the basis of much applied work. For example, the literature on trade liberalization and wages relies heavily on regressions of IWDs on trade protections, often assuming explicitly that protections generate rents that cause IWDs. This assumption gives these regression coefficients their causal interpretation (see, for example, Pavcnik, Blom, Goldberg, & Schady, 2004, and the many studies building on their work). Other development economists study how workers in high-paying industries obtained their jobs (e.g., Chen, Lu, & Sato, 2010; Chen, Lu, & Wan, 2010). High-paying industries are identified by measured IWDs, and regressions are employed to examine the role of workers' personal characteristics and social connections in obtaining jobs in these industries. Here too, the interpretation relies on the assumption that wages are tied to jobs, not to the productivity of the specific workers they employ. This ubiquity of cross-sectional IWDs in studies of rent distribution provides a further motivation for understanding what drives them.

The available evidence against a central role for unobservable worker quality in explaining IWDs in developing economies is suggestive, but not entirely convincing. For example, if IWDs do partly reflect rent-sharing arrangements that ensure loyalty by treating workers equitably (e.g., Arbache, 2001), then the high wages paid to unobservably talented workers in the most skilled occupations in a talent-dependent industry should transfer to less-skilled occupations as well. In this case, while IWDs would still remain once we correct for worker fixed effects, they would be smaller. Estimates of IWDs with worker fixed effects would therefore add significantly to the evidentiary base.

3. EMPIRICAL SETTING

The Asian Financial Crisis was a major shock to Indonesia's labor markets (Sugiyarto, Oey-Garinder, & Triaswati, 2006).