Paying Outsourced Labor: 
Direct Evidence from Linked Temp Agency-Worker-Client Data*

Andres Drenik  
Columbia

Simon Jäger  
MIT

Pascuel Plotkin  
UBC

Benjamin Schoefer  
Berkeley

March, 2020

Abstract

We estimate how much firms differentiate pay premia between regular workers and outsourced workers. We study temp agency work arrangements, in which workers perform their labor at a user firm but are formally employed by a temp agency. Pay setting in such arrangements has previously escaped measurement because existing data sources do not report links between user firms and temp agency workers. We overcome this measurement challenge by leveraging unique administrative data from Argentina with information on temp agency workers’ user firms. We estimate that temp agency workers receive 67% of the workplace-specific pay premiums earned by regular workers in user firms: a substantial markdown, but closer to the benchmark for insiders (one) than the competitive spot-labor market benchmark (zero).

*We thank Raffaele Saggio for useful discussions. We also thank participants at the ASSA 2020 Meeting, Stanford SIEPR, and the University of British Columbia for feedback. We thank Nikhil Basavappa for research assistance and the Good Companies, Good Jobs Initiative at MIT Sloan for financial support.
1 Introduction

We shed direct light on wage setting for outsourced workers. We study employment mediated by temporary help agencies (“temp agencies”), where the workplace is at a user firm even though the temp agency serves as the formal employer. Temp agency work is a facet of outsourcing and, more broadly, non-standard work arrangements, which have been associated with lower wages and increased inequality (Weil, 2014). Specifically, we focus on firms’ wage policies in the form of pay premia. The between-firm wage dispersion arising from pay premia constitutes a deviation from the law of one price that would arise in spot labor markets. These premia can arise in imperfectly competitive labor markets through bargaining or monopsony (see, e.g., Card et al., 2018). A long-standing hypothesis is that non-standard work arrangements and specifically outsourced, temp agency work erode such pay premia by plausibly operating closer to a spot labor market or by lowering workers’ bargaining power. In contrast, forces such as equity concerns (Card et al., 2012; Breza, Kaur, and Shamdasani, 2017; Dube, Giuliano, and Leonard, 2019; Saez, Schoefer, and Seim, 2019) or imperfect observability of effort (Akerlof and Yellen, 1986; Katz, 1986) may lead firms to extend firm-specific pay premia even to outsourced labor.

User firms’ wage setting for outsourced labor has so far largely escaped measurement because typical data sets exclusively associate outsourced workers with their formal employer – in our case, the temp agency –, rather than the workplace – the user firm. This is true for surveys (on top of inherent challenges of measuring non-standard work arrangements in snapshot survey data recently been documented in Abraham and Amaya, 2018; Abraham et al., 2018; Katz and Krueger, 2018, 2019). But the challenge extends to typical administrative matched employer-employee data sets, which generally do not show links between temp agency workers and user firms. We illustrate this issue in Figure 1. This challenge has prevented studying the relationship of pay policies of the user firms’ regular workers and its temp workers. An important exception is Goldschmidt and Schmieder (2017), who use outsourcing events of clusters of workers in low-skilled service occupations to measure the wage changes of the affected occupations, and in additional results document some evidence that this outsourcing effect is larger in firms with initially higher pay premia, consistent, for example, with lower rent sharing with outsourced workers.

Our paper overcomes the fundamental measurement challenge by drawing on unique administrative matched employer-employee data data on the universe of workers in temp---

---

1For instance, Katz (2017) describes this view as follows: "When janitors work at Goldman Sachs as Goldman Sachs employees, they tend to share in the firm’s huge productivity benefits and huge rents. But if they work for Joe’s Janitorial Services, they no longer share in those rents.” Abraham (1990); Dube and Kaplan (2010) and Goldschmidt and Schmieder (2017) present evidence on the wage penalty associated with non-standard work arrangements and outsourcing.
porary work arrangements with information on both their temp agency as well as the user firms. This linkage permits us to study directly the differentiation of pay premia between regular and temp agency workers within a workplace.

Our research design identifies pay premia by means of the wage changes accompanying worker moves across employers (Abowd, Kramarz, and Margolis 1999, henceforth AKM). Such workplace pay premia for regular workers are associated with higher productivity (as documented by, e.g., Card et al. 2018) and can hence be interpreted as facets of rent sharing directly observable in matched employer employee data. We also document that worker tenure is longer in firms with higher AKM firm effects, thus consistent with higher rents and higher-quality jobs. We ask whether these pay premia, whatever their source, are shared with outsourced labor.

In a first step, we compare cross-sectional dispersion measures of workplace-level pay premia separately for regular and temp agency workers. The competitive benchmark for temp workers and the associated law of one price would imply little dispersion among temp workers. Even though somewhat smaller compared to regular work arrangements, the dispersion of pay premia of temp agency workers is substantial. Specifically, the user firm pay premia have a standard deviation of 17 log points, while it is 21 log points in regular work arrangements in this same sample of user firms. These dispersion measures are robust to a split-sample measurement error correction, which shrinks the standard deviations to 15 log points for pay policies for temp work arrangements, and to 18 log points for regular work arrangements.

We additionally show that temp agency workers are negatively selected in terms of their AKM worker fixed effects. Overall, we estimate a penalty from temp labor of about 14%. Moreover, firms hiring temp agency workers tend to have higher regular worker AKM workplace effects, consistent with high-wage firms using outsourcing to save on labor costs. Alternatively, more productive firms both pay higher wages and engage in more complex modes of production.

In a second step, we compare the workplace pay premia estimates (AKM firm effects) for temp agency and regular work arrangements within firms. We therefore measure the degree to which high-wage firms for regular work arrangements are also high-wage firms for outsourced labor. Here, a view of temp workers treated as insiders in wage setting would predict a slope of one. By contrast, either the competitive spot labor market

\[ \text{Our work thus complements growing evidence documenting that firms may not set pay premia policies equally with all worker types. Using an AKM approach, Card, Cardoso, and Kline (2015) link the gender pay gap with differential rent sharing in Portugal. Gerard et al. (2018) link the racial wage gap with AKM premia differentials in Brazil. Daruich, Di Addario, and Saggio (2017) document differential rent sharing with workers on fixed-term contracts and open-ended contracts in Italy.} \]
benchmark or treatment of temp workers as a separate class of workers would predict a flat line. We also nonparametrically correct for measurement error in the pay premia by splitting regular workers into two groups and taking these groups’ slope as benchmarks (as in Goldschmidt and Schmieder, 2017; Gerard et al., 2018), slightly flattening the benchmark of the slope of one to 0.73. We find a reduced form slope of 0.49 for temp agency work arrangements. Relative to the benchmark of 0.73, we thus find that temp agency workers receive 67% (0.49/0.73) of the workplace-specific pay premiums earned by regular workers in user firms: a substantial markdown, but closer to the benchmark for insiders (one) than the competitive spot-labor market benchmark (zero).

Along several other dimensions, we also find that the market for temp agency labor is subject to similar forces that generate between-wage dispersion in pay premia associated with regular labor markets. Specifically, we find that assortative matching between workers and firms is slightly less pronounced for temp labor but still substantial: just as high-wage workers sort into high-wage firms, we find that high-wage temp workers sort into high-paying workplaces. Specifically, we estimate an elasticity of the worker AKM fixed effect to the firm fixed effects of 0.27 for regular workers, compared to a 0.22 effect for temp workers. This suggests that the sorting forces that amplify between-firm wage dispersion carry over to a large though somewhat attenuated degree to the market for outsourced labor. This result is robust to considering sorting between temp agencies and client firms, for which we find a precisely estimated zero.

We discuss interpretations and implications of our findings in the conclusion section.

2 Institutions and Data

Temporary Work Agencies and Regulation The Argentinian labor market for temporary work shares characteristics with those of other countries along various dimensions. First, temp agencies in Argentina pay below-average wages (Beccaria and Maurizio, 2017). Second, temporary work agencies in Argentina have a similar business model and regulatory environment compared to other OECD countries (OECD/IDB EPL Database, 2015). Finally, about 1.5% of employees were employed through a temp agency in 2005 (source: own calculations, SIPA, described below) compared to 0.9% in temp agencies and 1.4% through contract firms in the US (calculations based on February-2005 CPS, see Table 2 in Katz and Krueger, 2018).

Temp workers’ labor earnings as well as payroll taxes are paid by the temp agency (typically monthly, the frequency at which we see administrative earnings). We draw on a representative Labor Force Survey (Encuesta Permanente de Hogares) to compare weekly
hours of work of temp agency and regular workers and find that they are similar (36.18 hrs/week, SD 12.15, vs. 34.61 hrs/week, SD 13.16, respectively, see Appendix Figure A.1 Panel (b)). As in many countries, there are a number of formal regulations of temp agency pay. De jure, the temp agency ought to pay the worker the wage specified by the collective bargaining agreement corresponding to the actual job, or the wage effectively paid in the user company. An open question is the degree to which such common regulations are binding and complied with, or whether firms (as with potential gender or racial wage gaps even in the presence of anti-discrimination laws) may find ways to circumvent the policies. For example, temp wage penalties and associated cost savings may point to imperfect compliance. In our study, partial compliance may be one formal institutional factor contributing to similar pay policies across types within a firm, although we cannot definitely distinguish this channel from others, as we discuss in Section 5.

Administrative Social Security Records (SIPA) We use monthly administrative employer-employee matched data from 1996 to 2018, from the national social security system (Sistema Integrado Previsional Argentino, “SIPA”). The data set (described in further detail in, e.g., Tortarolo 2019) covers the universe of formal worker employed in all regions, industries and types of contracts. This corresponds to more than 15 million workers and 40 million job spells. The data set includes information about workers (gender and age) and their jobs (type of contract, part-time/full-time indicator, compensation components), as well as some characteristics of the firm (sector, province). SIPA also provides firm and worker tax identifiers. SIPA reports total wages earned in each month, which include all forms of payment that are taxable or subject to social security contributions. These measures are not top-coded. We CPI-deflate all payments to correspond to January 2008 ARS.

Administrative Worker-Client-Agency Linkage (SR) In addition, we exploit administrative data linking the temp agency employing the worker and the user firms via tax identifiers of the temp workers and temp agencies and clients (Simplificacion Registral, “SR”), which is available since 2008. This unique data source stems from a 2006 reform of temp agency work, which required temp agencies to register temp workers with the Ministry of Labor, at a bimonthly frequency, submitting information on the worker, the user company, the position type, the remuneration, and the start and end dates of the contract. These filings are sworn statements, audited and hence of administrative quality.

Defining Earnings Concepts We use SIPA for earnings data, where we observe monthly nominal pre-tax compensation paid by formal employers. For temp workers, compensation
is paid by the temp agency. To remove ambiguity about earnings sources (workplaces) and hours and days worked, we restrict our sample of temp workers to those providing services to a single user firm in a given month, hence dropping temp spells with simultaneous user firms or partial-month spells. We winsorize earnings at the 1% on both sides. We also drop earnings with real income < 0.5× the real 2008 minimum wage (in 2008, the nominal minimum earnings were USD340 per month) adjusted by average growth rate of real income in the entire sample (i.e., 1.4% annual growth).

3 The Wages of Temp Agency Work in Argentina

Summary Statistics In Appendix Tables [A.1] and [A.2], we provide descriptive evidence on the types of workers in regular and temp agency arrangements, along with the characteristics of user firms. Overall, we find that temp agency workers tend to be younger (mean age of 28 vs. 38), and are more likely to be men (79% vs. 70%). For each industry, Appendix Figure [A.1] Panel (a) plots its temp agency employment as a share of total national temp agency employment, against its share in national regular employment. Deviations from the 45 degree line indicate that a firm accounts for more or less temp employment than predicted by its regular employment share. We find, e.g., that manufacturing relies particularly strongly on temp agency employment, while, e.g., education and health services as well as professional business services relatively less on such outsourced labor.

Estimating the Average Temp Agency Work Pay Penalty We next estimate the pay effect associated with temp agency work. We regress log wages earned by worker \( i \) in period \( t \) on an indicator for a temp work, TempAgencyArrangement\(_{it}\):

\[
\ln w_{it} = \alpha_i + \psi_{J_{it}} + \rho \times \text{TempAgencyArrangement}_{it} + X'_it \beta + \epsilon_{it}.\tag{1}
\]

As basic controls, \( X_{it} \), we include gender and a cubic polynomial in worker’s age as well as industry and year, or industry-by-year effects. Due to the panel nature of the data, we can also include worker effects, \( \alpha_i \), which address selection based on permanent differences between workers. As a novel feature of our dataset, we also include workplace fixed effects, \( \psi_{J_{it}} \), allowing us to estimate the temp agency work penalty comparing workers in temp agency rather regular work arrangements in the same workplace. We estimate (1) based on the procedure in Correia (2017) and cluster standard errors at the worker level.

We report results for the main specifications of (1) in Table [I]. Column (1) reports the raw temp effect of -0.133 (SE 0.0005) with only year effects. This effect is cut substantially to
-0.075 (SE 0.001) once we include the gender and age controls, particularly as temp agency workers tend to be younger than regular workers (see Appendix Tables A.1 and A.2). We next report specifications with industry or industry-by-year effects, which increases the temp penalty to -0.191 (SE 0.001). When we include worker effects in the next column, we find a point estimate for the penalty of -0.0795 (SE 0.0005), consistent with the previous specification overestimating the temp penalty due to negative worker selection.

One possibility beyond the scope of our paper is the degree to which temp agency work may serve as a stepping stone or point of entry (Autor and Houseman, 2010; Autor, Houseman, and Kerr, 2017). The data set we have introduced will uniquely lend itself to such analyses.

Estimating Workplace Premia for Regular and Temp Agency Workers

We next estimate modified AKM specifications (Abowd, Kramarz, and Margolis, 1999), where we allow for separate workplace effects for regular and temp agency workers, which we will then juxtapose in Section 4. Formally, we estimate the following specification:

$$\ln w_{it} = \alpha_i + \psi_{J_{i,t}}^{W} + \xi_{TA_{i,t}}^{TempAgency} + X_{it}'\beta + \epsilon_{it},$$

(2)

where $\alpha_i$ are worker fixed effects and $\psi_{J_{i,t}}^{W}$ are work-arrangement-specific workplace effects. The superscript $W_{i,t} \in R, T$ indicates whether the worker $i$ is employed through a temp agency ($T$) or a regular employment relationship ($R$) in period $t$, and $J_{i,t}$ denotes the workplace. In addition, we include temp agency effects, $\xi_{TA_{i,t}}^{TempAgency}$, for the temp agency $TA_{i,t}$ at which a temp agency worker $i$ is formally employed in period $t$. We include as control variables, $X_{it}$, a cubic term in worker age and year fixed effects. Intuitively, wage changes of movers between different workplaces and work arrangements identify the fixed effects. We estimate (2) in the largest connected set, capturing 60.8% of firms and 95.9% of worker-year-spell observations.

Do High-Wage Firms Offer Better Jobs?

We next assess whether high-wage firms offer better jobs by studying the cross-sectional relationship between tenure and pay premia. Since we include temp agency fixed effects and workplace effects, these effects are not separately identified in cases where a user firm only hires temp workers from one temp agency and the temp agency, in turn, only provides workers to one user firm. So our estimates will be identified off firms with multiple connections within a connected set.

---

3This specification mirrors analogous specifications in Card, Cardoso, and Kline (2015), Daruich, Di Ad-dario, and Saggio (2017), and Gerard et al. (2018), who allow for separate firm effects by gender, contract modality, and race, respectively. Such a specification can emerge in a model with wage posting and labor supply elasticities to the firm differing by work arrangement (Card et al., 2018), or in a bargaining model with work-arrangement specific bargaining powers (Card, Cardoso, and Kline, 2015).

4Since we include temp agency fixed effects and workplace effects, these effects are not separately identified in cases where a user firm only hires temp workers from one temp agency and the temp agency, in turn, only provides workers to one user firm. So our estimates will be identified off firms with multiple connections within a connected set.
This line of analysis follows the revealed-preference approach that good jobs last longer (see, e.g., Krueger and Summers, [1988]). If, for example, higher pay premia reflected only compensating differentials then workers would be indifferent between jobs with higher or lower pay premia. However, we find a strong positive relationship between tenure and pay premia, reported in Figure 3. Quantitatively, a ten percent higher AKM pay premium for regular workers is associated with a four months longer tenure. Our evidence is thus consistent with high-wage firms offering better, higher-surplus jobs and sharing rents with their regular workers, rather than merely reflecting, e.g., compensating differentials or simply hours differences.

**Which Workers Select into Temp Work?**  We plot the estimated fixed effects in the histogram in Figure 2. In Panel (a), we plot AKM worker effects, separately for those ever and never employed in a temp agency between 2008 and 2017. The histograms look strikingly similar, although we find that a mean difference of 9 log points, indicating that workers ever employed in a temp agency arrangement were negatively selected on average in terms of their person fixed effect. Since our design controls for work arrangements, this effect is not mechanically driven by a higher frequency of temp work.

**Which Firms Hire Temp Workers?**  In Panel (b) of Figure 2, we plot the distribution of regular firm effects, separately for those firms that ever or never hired temp workers (weighting observations by the number of workers). The histograms show that user firms’ pay policies are shifted to the right, with a mean difference in the firm effect of 0.27. Our results thus indicate that firms that outsource labor are positively selected in terms of their pay policies for regular workers, i.e. high-paying firms are more likely to have outsourced labor. This pattern is consistent with cost-saving theories of outsourcing, by which high-wage firms seek to lower their wage bill by hiring temp workers. Or, it could reflect selection by which more productive firms pay higher wages and engage in more complex modes of production. Lastly, it could reflect industry composition or firm size effects.

**Assortative Matching**  We further investigate assortative matching of regular and temp agency workers to firms by relating the average AKM worker effects for the two type of workers to firms’ AKM pay premia (for regular workers) in Appendix Figure A.2. We find positive slopes of 0.27 for regular and 0.22 for temp agency workers, respectively. Hence, a four months increase corresponds to about a ten percent increase in tenure, so that the elasticity of tenure w.r.t. pay premia is about one. Our evidence is consistent with more recent work by Bassier, Dube, and Naidu (2019) based on matched employer-employee data from Oregon.
the degree of sorting is similar but somewhat less pronounced for temp workers, consistent
with, for instance, temp agencies assigning their most productive workers to their most
productive clients, or with high wage temp workers managing to obtain the best-paying
assignments. The large degree of assortative matching also implies that the temp labor
market appears to be subject to similar forces that are known to amplify between-firm
wage dispersion.

In addition, we investigate the sourcing strategies of user firms by comparing the
average temp agency premium to their regular worker workplace premium, i.e. asking
whether high-wage firms hire from high-wage temp agencies. This additional analysis
complements the worker-based one above, recognizing that the market for temp labor is
intermediated by agencies. If, for example, high-wage temp agencies provide services to
high-wage client firms, then the total assortative matching may be even larger. Here, we
find a flat slope of -0.007, rejecting the hypothesis of assortative matching between temp
agencies and client firms on the basis of AKM pay premia (Appendix Figure A.3). Overall,
we therefore find considerable sorting of high wage workers into high-wage firms even
among temp workers, but little sorting between temp agencies and client firms in terms of
their respective wage premia.

**Between-Firm Dispersion in Pay Policies for Regular and Temp Workers**  Most impor-
tantly for our eventual goal to understand intra-firm pay policy differences, in Panel (c),
we plot the distribution of workplace effects for regular and temp work arrangements in
the sample of user firms. These firms relying on temp labor are larger, as they make up
30.6% (1%) of our original sample of firm-month (total firms) observations. Here, we find
a downward shift for workplace effects for temp compared to regular work arrangements.
The average difference of the mean pay premium is 17 log points lower for temp work
arrangements compared to regular ones. This difference reflects the average temp work
arrangement effect holding the workplace fixed, in this sample.

Importantly, the dispersion of the workplace effects is nearly as high for temp agency
workers’ user firms as for the workplaces of regular workers – a stark rejection of the law
of one price for temp agency workers. Specifically, the raw standard deviation in the pay
premia is 17 log points for temp workers, and 21 log points for regular workers.

We also implement a measurement error correction based on a split-sample IV pro-
cedure, leading us to scale down the standard deviation for pay premia of temp agency
workers to 15 and the one for regular workers to 18 log points.\(^6\) Overall, the standard

\(^6\)Specifically, we split our sample of workers into two random groups \(S_1\) and \(S_0\) and estimate the AKM
specification (2) separately in both samples. We then calculate the covariance of the two separate sets of

8
deviation is reduced by one sixth, indicating that temp labor markets appear somewhat closer (but still considerably far) from complying with the law of one price that would be predicted to prevail in a competitive spot labor market. The large remaining degree of dispersion following this simple split-sample approach also validates our AKM fixed effect as a measure of heterogeneous firms’ pay policies.

4 Do High-Wage Firms Share Pay Premia With Temp Agency Workers?

Our core specification relates the workplace pay premia between temp agency and regular workers at the same workplace. These patterns could, for example, reflect the relative degree of rent sharing, and or the degree to which employers can differentiate pay of outsourced labor.

Strategy: Comparing Temp and Regular Pay Premia Within Client Firms Building on (2), we use the estimated workplace pay premia received by temp agency workers, $\psi_{iT}^T$, and compare them to those of their peers in regular employment relationships at the same workplace, $\psi_{i,t}^R$:

$$\psi_{iT}^T = \alpha + \gamma \psi_{i,t}^R + \nu_{it}. \quad (3)$$

Our coefficient of interest is $\gamma$, the slope capturing the elasticity of temp pay premia to regular pay premia. We estimate (3) with OLS.

Polar Benchmarks: Law of One Price vs. Insiders We highlight two polar benchmarks for slope $\gamma$. First, if firms’ pay policies for outsourced workers mirror those for insiders in regular work arrangements, we would expect $\gamma = 1$. This benchmark would arise in the presence of similar degrees of rent sharing and rents to be shared, or firms for institutional, formal or informal, cannot differentiate pay within the firm across work arrangements.

fixed effects within each work arrangement. Let $\tilde{\psi}_{j}^{R,S1} = \psi_{j}^{R} + \tilde{\xi}_{j}^{R,S1}$ denote the estimate of the firm fixed effect for regular work arrangements, equaling the true firm effect plus estimation error. We then have $\text{cov}(\tilde{\psi}_{j}^{R,S1}, \tilde{\psi}_{j}^{R,S0}) = \text{cov}(\psi_{j}^{R} + \tilde{\xi}_{j}^{R,S1}, \psi_{j}^{R} + \tilde{\xi}_{j}^{R,S0}) = \text{var}(\psi_{j}^{R})$ as long as $\text{cov}(\tilde{\xi}_{j}^{R,S1}, \tilde{\xi}_{j}^{R,S0}) = 0$, and analogously for $\text{var}(\psi_{iT}^{T})$. The measurement error correction leads us to shrink the standard deviation of regular work arrangement workplace effects by 14.6% and the one for temp agency work arrangements by 11.7% (perhaps because temp work arrangements have more homogeneous pay policies in a given firm).

7For ease of interpretation, we normalize $\psi_{iT}^{T}$ (and $\psi_{i,t}^{R}$) to zero for the average firm in the restaurant and hospitality sector as Gerard et al. (2018) and Card, Cardoso, and Kline (2015), but this normalization is inconsequential for our estimation of the slope $\gamma$, as any other normalization would be absorbed by the intercept.
Second, if firms pay a market price for temp agency workers, or if temp pay premia are unrelated to regular premia, then we would expect $\gamma = 0$.

**Results** We report binned scatter plots of $\psi^T_{J_{i,t}}$ plotted against $\psi^R_{J_{i,t}}$ in Figure 4. Panel (a) does so for levels, and Panel (b) repeats the analysis but considers changes in pay premia. Here, we weight firm observations by total monthly observations. Panel (a) indicates that the empirical pay premia trace out a slope of $\gamma^{OLS} = 0.49$ (SE $5.65 \cdot 10^{-5}$). That is, comparing two firms, A and B, with B offering a 10% pay premium for its regular workers compared to firm A, the corresponding pay premium for temp agency workers at B vs. A would be predicted to be 4.9%. Hence, firms appear to extend their pay premia to a large degree also with outsourced labor.

**Measurement Error Correction: Split Sample IV** We now probe the robustness of our findings. First, we account for the fact that measurement error may lead to a downward bias in $\gamma^{OLS}$. The effects $\psi^R_{J_{i,t}}$ are generated regressors such that the variance of $\psi^R_{J_{i,t}}$ captures both true variation in regular workers’ pay premia across workplaces along with noise due to sampling variability (Andrews et al., 2008; Kline, Saggio, and Solvsten, 2019).

To gauge the quantitative importance, we implement a simple split-sample procedure (see, e.g., Goldschmidt and Schmieder, 2017; Gerard et al., 2018 for similar resolutions). We find a corrected coefficient of $\gamma^{IV} = 0.67$ (SE $5.65 \cdot 10^{-5}$). Specifically, we split the universe of workers into two randomly drawn groups and then separately estimate regular workplace effects in AKM specifications for the two samples, which we label $S_1$ and $S_0$. We then regress the $\psi^R_{J_{i,t}}$ on those of $\psi^R_{J_{i,t}}$. If there is no sampling variability and measurement error, we would expect a coefficient of one for this regression; if the workplace pay premia dispersion only reflects noise, then we would expect a coefficient of zero. In Appendix Figure 4, we show a binned scatter plot of $\psi^R_{J_{i,t}}$ against $\psi^R_{J_{i,t}}$, and report an OLS coefficient of 0.73. Hence, measurement error attenuates our coefficient of OLS specification (3) by $1 - 0.73 = 27\%$ of the true population coefficient. Figure 4 Panel (a) includes this measurement-error adjustment benchmark rather than the slope of one. In Figure 4 Panel (a), we thus also report an IV estimate of $\gamma^{IV} = 0.49/0.73 = 0.67$ (SE $5.65 \cdot 10^{-5}$) from a specification where $\psi^R_{J_{i,t}}$ serves as an instrument for $\psi^R_{J_{i,t}}$ (with a first stage coefficient of 0.73, using $\psi^R_{J_{i,t}}$).

---

*The slope between temp agency and regular work arrangement workplace effects is quantitatively similar at 0.49 both for our previously reported estimate (with $\psi^R_{J_{i,t}}$ based on the full sample of regular workers) and the randomly split sample (which yielded instrument $\psi^R_{J_{i,t}}$).*
temp agency workers only have a temporary attachment to a particular user firm. If pay premia only accrue to new hires once they become stably employed incumbents (as in Kline et al. 2019, who document differential rent sharing with new hires and incumbents), or if pay compression works within comparable jobs, then it may not be only the work arrangement but also the limited attachment that drive our attenuated alignment of pay policies. We hypothesize that an alternative benchmark based on separately estimated AKM effects for regular workers with lower attachment, such as with, e.g., shorter tenure or on fixed-term contracts, could hence yield even higher implied IV effects.

5 Interpretation and Implications

Overall, our findings suggest that a labor market moving away from regular work arrangements closer to a spot market, such as one mediated by temp agencies, does appear to lower wage dispersion to a limited degree – as firms appear to pay only two-thirds of a workplace-specific pay premia to temp workers. We close with interpretations of our findings and a discussion of potential implications.

Why Do Firms Compress Pay Premia for Temp Workers? One reading of the estimate is that the glass is one-third empty: workers in temporary work arrangements do not appear to share in the rents, as proxied for by AKM pay premia, of a firm as much as workers that are formally and directly employed at their place of work. One explanation draws on bargaining, with temp workers having lower bargaining power (analogously to the gender wage gap and rent sharing in Card, Cardoso, and Kline 2015). Alternatively, three-party bargaining – between the temp workers, the user firm and the temp agency – may lead the temp agency to appropriate some of the rents; similarly double marginalization may be occurring. Or, temp agency labor supply to specific firms may simply be more elastic (as in the model in Card et al. 2018, which gives rise to an AKM specification). The attenuated slope is also consistent with findings by Daruich, Di Addario, and Saggio (2017) for lower firing costs (in fixed-duration job) to be associated with lower rent sharing.

The attenuation of pay policy premia may also contributes to the ongoing debate regarding the forces leading firms to outsource labor (see, e.g., Abraham and Taylor 1996; Houseman, Kalleberg, and Erickcek 2003; Autor 2003 for existing evidence). Here, our findings suggest that in particular high-wage firms can moderately cut labor costs by relying on temp workers – but to a lesser degree than the competitive benchmark would have suggested, as they still appear to pay a premium even to outsourced labor.
Why Do Firms Pass on Such a Large Share of Pay Premia to Temp Workers? Alternatively, the glass is two-thirds full: our estimates reveal considerable evidence for pay premia to be shared with temp workers, compared to the competitive spot labor market benchmark for temp agency labor with wages equalized across employers. The considerable degree of pay premia sharing is consistent with theories of fairness norms in the workplace reflected in workers’ dislike for pay differences leading to pay compression (see, e.g., Bewley, 2009; Card et al., 2012; Breza, Kaur, and Shamdasani, 2017; Saez, Schoefer, and Seim, 2019; Dube, Giuliano, and Leonard, 2019). Alternatively, efficiency wage theories based on moral hazard would imply that incentive compensation would pass through into pay for regular as well as temp workers performing the same job.

Viewed through the lens of labor market monopsony, the alignment of pay premia would imply that the firm-specific supply of temp labor is far from perfectly elastic and far from a competitively supplied intermediate service. Sources of imperfectly elastic supply include heterogeneity in workers’ preferences for certain employers or mobility costs, factors that plausibly guide temp labor supply, too. It may also reflect monopolistic behavior by the temp agency itself, which intermediates temp labor supply.

Another interpretation is partial but considerable compliance with the standard regulatory framework, which would de jure mandate firms to pay equal wages across work arrangements for the same job. It is beyond the scope of our paper to isolate the role of this channel. Yet, Argentina’s relatively large informal sector suggests that our setting leaves plausibly some room for noncompliance compared to other countries. We also point to analogous evidence for differential rent sharing between men and women (Black and Strahan, 2001; Card, Cardoso, and Kline, 2015) despite laws that ought to ban discrimination based on gender.
References


OECD/IDB EPL Database. 2015. “Employment Policies and Data: Argentina.”


6 Figures

Figure 1: Measurement Challenges: Regular and Temp Agency Work Arrangements

(a) Regular Work Arrangements

(b) Temp Agency Work Arrangements

(c) Measurement of Temp Agency Work Arrangements in Typical Matched Employer Employee Data

(d) Measurement of Temp Agency Work Arrangements in Argentinian Matched Employer Employee Data (Dual Registration)

Note: The figure illustrates regular and temp agency work arrangements and their measurement in administrative data. Panel (a) plots regular work arrangements where employer and workplace typically coincide. Panel (b) illustrates the case of temp agency work arrangements where a temp agency serves as the employer while the user firm is the actual workplace. The links between user firms are generally not observed in matched employer employee datasets (Panel (c)), as no direct contractual links exist between the user firm and the temp agency worker. Panel (d) illustrates the case of Argentinian matched employer employee data, which allow us to observe links between user firms and temp agency workers due to dual registration.
Figure 2: Worker and Firm Effects For Regular Workers and Temp Agency Workers, and Work Arrangements

(a) AKM Worker Effects: Never- and Ever-Temp Agency Workers

(b) Regular Work-Arrangement Workplace Effects of User and Non-User Firms

(c) AKM Workplace Effects: Regular and Temporary Agency Work Arrangement Effects for Ever-User Firms

Note: The figures report histograms of AKM worker and workplace effects. Panel (a) studies selection of workers into temp agency work and plots histograms of AKM worker effects for workers who were ever or never employed in a temp agency work arrangement. The histograms overlap substantially although the mean worker effect is 9 log points lower for workers ever employed in a temp agency arrangement, i.e. indicating negative selection into becoming a temp agency worker. Panel (b) studies selection of firms into outsourcing labor (i.e. becoming a user firm of temp agency workers). It plots the histogram of AKM workplace effects for regular work arrangements, separately for firms that were ever user firms and those that never hired through temp agency arrangements in our observation period (non-user firms). The distribution for user firms is shifted to the right by 27 log points, i.e. indicating that firms with higher wage policies for regular workers are more likely to have outsourced labor. Finally, panel (c) juxtaposes the workplace pay premia in temp agency and regular work arrangements within the same workplace as it draws on the sample of user firms. The histograms indicate higher workplace pay premia in regular work arrangements.
Figure 3: Average Tenure vs Regular Firm Fixed Effects

Note: This figure shows a binned scatter plot of estimated firm effects for firms acting in regular work arrangements, $\psi_{j_{i,t}}^R$, plotted against the average tenure, in months, of workers under regular work arrangement at the firm (slope 40.7; SE 0.002). The estimated firm effects are restricted to those firms among the largest connected set that, at any point in our sampling window, served as the workplace of temp agency workers.
Figure 4: Estimated Firm Effects for Temp Agency and Regular Work Arrangements

(a) Levels

Benchmark for Insiders: \( \gamma = 1 \)

Correcting for Measurement Error: \( \gamma = 0.73 \)

Competitive Benchmark: \( \gamma = 0 \)

\( \gamma = 0.49 \)

Implied IV \( \gamma = 0.67 \) (SE = 5.65 \( \ast \) 10\(^{-4} \))

(b) Changes

Benchmark for Insiders: \( \gamma = 1 \)

\( \gamma = 0.37 \)

(SE = 1.73 \( \ast \) 10\(^{-4} \))

Note: The figure shows a binned scatter plot of firm effects of estimated firm effects for firms acting as user firms for temp agency workers, \( \psi_{T_{it}} \), plotted against firm effects in regular work arrangements, \( \psi_{R_{it}} \). Panel (a) does so for a cross-sectional comparison using all years (slope 0.49; SE 5.52E-05); Panel (b) plots the changes in the fixed effects, splitting the data in two period windows, from 2009 to 2013 and from 2014 to 2017 (slope 0.35; SE 1.74E-04). The estimated firm effects are restricted to those firms among the largest connected set that, at any point in our sampling window, served as the workplace of temp agency workers. The orange regression line corresponds to the OLS regression line following specification (3). The dashed blue line corresponds to a benchmark slope correcting for measurement error, from a split-sample procedure in which we split workers in regular employment relationships into two random subsamples, calculate firm fixed effects and regress the firm effects from one random sample on those from the other.
# Table

Table 1: Temp Agency Arrangement Pay Penalty

<table>
<thead>
<tr>
<th></th>
<th>Outcome: Log Wage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Temp Agency Arrangement</td>
<td>-0.133***</td>
</tr>
<tr>
<td></td>
<td>(0.000523)</td>
</tr>
<tr>
<td>Year</td>
<td>Yes</td>
</tr>
<tr>
<td>Gender</td>
<td>No</td>
</tr>
<tr>
<td>Age Cubic</td>
<td>No</td>
</tr>
<tr>
<td>Industry FE</td>
<td>No</td>
</tr>
<tr>
<td>Industry - Year FE</td>
<td>No</td>
</tr>
<tr>
<td>Worker FE</td>
<td>No</td>
</tr>
<tr>
<td>Firm FE</td>
<td>No</td>
</tr>
<tr>
<td>R-Squared</td>
<td>0.011</td>
</tr>
</tbody>
</table>

Note: The table reports coefficients for the temp agency arrangement pay penalty $\rho$ in Mincer equations following regression specification [1]. Standard errors clustered at the individual level reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. 
Online Appendix of:

Paying Outsourced Labor:
Direct Evidence from Linked Temp Agency-Worker-Client Data
Andres Drenik, Simon Jäger, Pascuel Plotkin, and Benjamin Schoefer
A Appendix Figures

Figure A.1: Industry Distribution and Hours of Work of Temp Agency and Regular Workers

(a) Industry Distribution of Temp Agency and Regular Employment

![Graph of industry distribution](image)

(b) Temporary and Regular Workers’ Average Weekly Hours

![Graph of weekly hours](image)

Note: Panel (a) plots the share of national temp agency employment enlisted in an industry against that industry’s share of regular employment. Panel (b) plots temporary and regular workers average weekly hours, as reported in the continuous labor force survey (Encuesta Permanente de Hogares) for the years 2011 to 2018. We draw on two different definitions of temp agency work, available based on industry codes from 2011 onward. First, we plots the CDF of weekly hours when defining temp agency workers by their 2-digit industry code (mean 34.12; SE 13.16). Second, we show the CDF of weekly hours for temp agency workers defined by their 2-digit industry code and declaring working for a fixed period of time (mean 36.18; SE 12.15). As a benchmark, we also plot the CDF of hours for regular workers (mean 35.61; SE 16.50). The sample is restricted to workers who declared working less than 80 hours per week.
Figure A.2: Sorting of Regular and Temp Agency Workers: Estimated Worker Effects Against Firm Effects (By Work Arrangement)

(a) Regular Workers

(b) Temp Workers

Note: The figure shows a binned scatter plot of estimated worker effects plotted against estimated firm effects in regular work arrangements, $\psi_{R,i,t}^f$. Panel (a) plots the estimated worker effects for workers that are never temporary workers against the firm fixed effects under regular work arrangements (slope 0.27; SE 0.002). Panel (b) plots the estimated worker effects for workers that are at some point of our sample working under a temporary agency work arrangement with the firm fixed effects under regular work arrangements (slope 0.22; SE 0.002).
Figure A.3: Sorting in the Temporary Agency Market: Temporary Firms Fixed Effects Against Regular Firm Fixed Effects

Note: This figure shows a binned scatter plot of estimated firm effects for Temporary agency firms, $\xi_{TA_i,t}^{TempAgency}$, plotted against the estimated firm effects in regular work arrangements, $\psi_{RJ_i,t}^R$. The slope is -0.007 (SE 0.0001). The estimated firm effects of regular work arrangements are restricted to those firms among the largest connected set that, at any point in our sampling window, served as the workplace of temp agency workers.
## Appendix Tables

### Table A.1: Summary Statistics: All formal employees

<table>
<thead>
<tr>
<th></th>
<th>SIPA Dataset</th>
<th></th>
<th></th>
<th>Katz &amp; Krueger</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2011</td>
<td>2014</td>
<td>2017</td>
<td>2015</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Years</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median Age (years)</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td>50</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td>Mean Age (years)</td>
<td>37</td>
<td>38</td>
<td>38</td>
<td>48.3</td>
<td>42.6</td>
<td>42.5</td>
</tr>
<tr>
<td>Median Wage (dollars)</td>
<td>891</td>
<td>925</td>
<td>952</td>
<td>55.5</td>
<td>47.1</td>
<td>47.1</td>
</tr>
<tr>
<td>Mean Wage (dollars)</td>
<td>1,221</td>
<td>1,234</td>
<td>1,261</td>
<td>14.3</td>
<td>13.2</td>
<td>13.1</td>
</tr>
<tr>
<td>Female (percent)</td>
<td>29.7</td>
<td>30.4</td>
<td>30.9</td>
<td>55.5</td>
<td>47.1</td>
<td>47.1</td>
</tr>
<tr>
<td>Multiple Jobholder</td>
<td>3.0</td>
<td>3.1</td>
<td>3.3</td>
<td>14.3</td>
<td>13.2</td>
<td>13.1</td>
</tr>
<tr>
<td>In Labor Force (Percent of Population)</td>
<td>46.3</td>
<td>44.9</td>
<td>45.9</td>
<td>62.8</td>
<td>67.5</td>
<td>67.5</td>
</tr>
<tr>
<td>Part-Time Employment</td>
<td>11.1</td>
<td>12.1</td>
<td>13.4</td>
<td>26.2</td>
<td>24.2</td>
<td>23.5</td>
</tr>
<tr>
<td><strong>Industry (percent):</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture, Forestry, Fishing and Hunting</td>
<td>5.9</td>
<td>5.5</td>
<td>5.3</td>
<td>1.0</td>
<td>1.6</td>
<td>1.5</td>
</tr>
<tr>
<td>Mining</td>
<td>1.2</td>
<td>1.4</td>
<td>1.3</td>
<td>0.6</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Utilities</td>
<td>1.0</td>
<td>1.1</td>
<td>1.2</td>
<td>0.5</td>
<td>0.9</td>
<td>0.9</td>
</tr>
<tr>
<td>Construction</td>
<td>7.2</td>
<td>6.8</td>
<td>7.0</td>
<td>3.1</td>
<td>4.1</td>
<td>3.9</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>20.6</td>
<td>20.5</td>
<td>19.3</td>
<td>7.3</td>
<td>8.6</td>
<td>8.8</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>5.8</td>
<td>5.8</td>
<td>5.9</td>
<td>2.6</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Retail Trade</td>
<td>12.1</td>
<td>12.4</td>
<td>12.7</td>
<td>8.7</td>
<td>9.6</td>
<td>9.6</td>
</tr>
<tr>
<td>Transportation Warehousing and communication</td>
<td>8.6</td>
<td>8.9</td>
<td>8.9</td>
<td>6.4</td>
<td>9</td>
<td>9.2</td>
</tr>
<tr>
<td>Financial activities</td>
<td>2.5</td>
<td>2.6</td>
<td>2.6</td>
<td>9.2</td>
<td>9.2</td>
<td>9.2</td>
</tr>
<tr>
<td>Professional and Business Services</td>
<td>13.5</td>
<td>12.9</td>
<td>12.9</td>
<td>14.5</td>
<td>13.4</td>
<td>13.2</td>
</tr>
<tr>
<td>Education and Health Services</td>
<td>10.0</td>
<td>10.7</td>
<td>11.5</td>
<td>26.0</td>
<td>22.4</td>
<td>22.5</td>
</tr>
<tr>
<td>Leisure and Hospitality</td>
<td>3.9</td>
<td>4.1</td>
<td>4.3</td>
<td>5.4</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Other Services (Excluding Public Administration)</td>
<td>4.9</td>
<td>4.9</td>
<td>5.0</td>
<td>5.2</td>
<td>4.8</td>
<td>4.7</td>
</tr>
<tr>
<td>Temporary work agents</td>
<td>1.6</td>
<td>1.1</td>
<td>0.8</td>
<td>1.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Avg. Workers</strong></td>
<td>4,225,916</td>
<td>4,261,083</td>
<td>4,296,090</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Notes*: Summary statistics are for the overall (rather than final regression) sample.
Table A.2: Summary Statistics: All temporary work agents in user firms (SIPA-Registro version)

<table>
<thead>
<tr>
<th></th>
<th>SIPA Dataset</th>
<th>Katz &amp; Krueger</th>
<th>CPS Weighted</th>
<th>Alt. Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Average for workers in user firms during each year)</td>
<td>2011</td>
<td>2015</td>
<td>2017</td>
<td>2005</td>
</tr>
<tr>
<td>Median Age (years)</td>
<td>26</td>
<td>26</td>
<td>26</td>
<td>44</td>
</tr>
<tr>
<td>Mean Age (years)</td>
<td>28</td>
<td>28</td>
<td>28</td>
<td>44.0</td>
</tr>
<tr>
<td>Median Wage (dollars)</td>
<td>696</td>
<td>682</td>
<td>752</td>
<td>47</td>
</tr>
<tr>
<td>Mean Wage (dollars)</td>
<td>741</td>
<td>745</td>
<td>808</td>
<td>46.5</td>
</tr>
<tr>
<td>Female (percent)</td>
<td>22.6</td>
<td>21.2</td>
<td>20.6</td>
<td>38.6</td>
</tr>
<tr>
<td>Multiple Jobholder</td>
<td>10.2</td>
<td>8.9</td>
<td>9.1</td>
<td>7.4</td>
</tr>
<tr>
<td>Part-Time Employment</td>
<td>3.0</td>
<td>2.5</td>
<td>3.8</td>
<td>35.2</td>
</tr>
<tr>
<td><strong>Industry (percent):</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture, Forestry, Fishing and Hunting</td>
<td>0.5</td>
<td>0.3</td>
<td>0.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Mining</td>
<td>0.7</td>
<td>0.5</td>
<td>0.4</td>
<td>0.3</td>
</tr>
<tr>
<td>Utilities</td>
<td>0.3</td>
<td>0.3</td>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td>Construction</td>
<td>0.4</td>
<td>0.3</td>
<td>0.4</td>
<td>18.0</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>49.7</td>
<td>44.6</td>
<td>44.0</td>
<td>4.7</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>5.2</td>
<td>4.6</td>
<td>5.3</td>
<td>2.3</td>
</tr>
<tr>
<td>Retail Trade</td>
<td>12.6</td>
<td>11.4</td>
<td>12.5</td>
<td>7.1</td>
</tr>
<tr>
<td>Transportation Warehousing and communication</td>
<td>11.0</td>
<td>11.8</td>
<td>16.6</td>
<td>6.4</td>
</tr>
<tr>
<td>Financial activities</td>
<td>2.6</td>
<td>2.2</td>
<td>1.8</td>
<td>7.8</td>
</tr>
<tr>
<td>Professional and Business Services</td>
<td>4.9</td>
<td>4.4</td>
<td>4.1</td>
<td>23.4</td>
</tr>
<tr>
<td>Education and Health Services</td>
<td>0.3</td>
<td>0.4</td>
<td>0.5</td>
<td>13.9</td>
</tr>
<tr>
<td>Leisure and Hospitality</td>
<td>1.7</td>
<td>1.9</td>
<td>3.0</td>
<td>5.1</td>
</tr>
<tr>
<td>Other Services (Excluding Public Administration)</td>
<td>3.7</td>
<td>5.8</td>
<td>7.9</td>
<td>7.7</td>
</tr>
<tr>
<td><strong>Avg. Workers</strong></td>
<td>40,227</td>
<td>20,981</td>
<td>21,227</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Summary statistics are for the overall (rather than final regression) sample.