Competition and Contracting: The Effect of Competition Shocks on Alternative Work Arrangements in the U.S. Labor Market 1995-2005

WORKING PAPER

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Abstract

Alternative Work Arrangements (AWAs) are contract forms commonly associated with less attachment, lower wages, and fewer worker benefits. Even though AWAs are theoretically cheaper for firms, they continue to account for only 10% of employment. I explore why AWAs are not more widely used, given their purported economic benefit for firms. Legal rules suggest that while AWAs have lower fixed costs of employment, they may be less productive than standard employment and likely attract lower-type workers. In this instance, AWAs are used as a mechanism for firms to reduce fixed labor costs in response to a shock. Testing this prediction, I provide the first evidence that competition shocks, specifically trade shocks, causally increase the use of AWAs across a number of contract forms. Using micro-level data, I show that competition shocks appear to increase the probability of manufacturing workers being hired by temporary-help agencies, and decrease the probability of manufacturing workers becoming independent contractors. This suggests workers may have shifted towards AWAs in non-manufacturing industries. I also show that AWAs are associated with lower wages and fewer benefits after conditioning on industry and occupation, and are associated with higher rates of inequality.

1 Introduction

Who are employees? For individual workers, the answer to this question is incredibly important. It determines who has access to health benefits, workers' compensation, and unemployment insurance. Researchers have a common understanding that the full-time, 35+ hour a week employee is the standard form of work. However, researchers believe the "common" conception of employment is becoming rarer due to the rise of "gig" jobs.[1] Legal definitions of "employment" are determined by firms' control over the work process and the degree to which the worker is reliant on their employer for wages (Muhl, 2002). Based on this definition, many workers[2] are in a nebulous legal status, and their wages and hours can vary substantially depending on their contract. Commonly known as Alternative Work Arrangements (AWAs), a wide definition that encompasses a variety of contract forms, AWAs are better defined for what they aren't: the standard 40+ hours a week contract.

[1] See Katz and Krueger (2016)

[2] Such as workers at contract companies, employed by temporary help agencies, on call workers, independent contractors, and other contract forms. Approximately 10% of the labor force.

While some suggested AWA workers may be strictly cheaper for the firm (Muhl, 2002; Goldschmidt and Schmieder, 2017), if this were the case, we'd have expected an increase in AWA rates over time. However, AWAs appear to consistently hover around 10% of employment. Discussions on determinants of AWAs are wide-ranging (Dube and Kaplan, 2010; Goldschmidt and Schmieder, 2017; Katz and Krueger, 2016), but we still do not have an understanding of what causes firms to use AWAs.

In this paper, I seek to identify one of the potential determinants of AWAs, and better understand firms' usage of these contract forms. I discuss the legal rules surrounding AWAs, and outline a conceptual framework where firms use AWAs due to increased competition. AWAs reduce fixed labor costs, but the AWA worker is likely of lower type and legal restrictions result in lower productivity. I provide the first evidence that competition shocks, specifically trade shocks, causally increase the share of the working-age population in AWAs. I also show, consistent with the wider literature, that wages and hours for manufacturing workers increased over this period. I suggest that this is due to the average ability of post-shock worker increasing.

The use of AWAs after a shock suggests they may not be welfare reducing, and may actually increase efficiency. If firms use AWAs to offer an *additional* job, the counterfactual suggests that the worker would be otherwise unemployed. Research suggests that both AWAs (Goldschmidt and Schmieder, 2017; Autor and Dorn, 2013), and unemployment (Schmieder et al., 2018) have long-term detrimental effects relative to employment. If AWAs are better than unemployment over the long-term, they would be welfare increasing. On the other hand, if AWAs are used in lieu of regular employment, they could be welfare reducing and potentially less productive.

The paper is organized as follows. In Sections 2 and 3 I discuss the literature and legal rules surrounding AWAs. In Section 4 I describe my conceptual framework, where a firm uses an AWA to reduce fixed labor costs. However, due to legal rules the AWA will be less productive and will attract a lower-type employee than standard employment. Under this framework, I predict that a competition shock will decrease overall employment in the shocked industries, increase average wages due to type distribution, and lead to an increase in AWA rates.

In Sections 5 and 6, I outline my data and methodology for testing these predictions. Sections 7.1 and 7.2 provide reduced form evidence of demographic predictors and economic outcomes of AWA workers. I show that wages, hours, and flexibility can vary substantially by contract type, something discussed in Katz and Krueger (2016). There are some commonalities, but AWAs vary substantially across contracts. For example, the average independent contractor is older, while the average contract worker is wealthier, though

their income is more variable.[3] Higher wages may simply be compensation for low benefits rates, but when controlling for industry, occupation, and other covariates, *all* AWA rates have statistically the same or lower wage rates and benefits.[4] This could imply that these contracts are detrimental to workers, though these effects could be driven by unobserved type compositions.

In Section 7.3, I test the effect of competition shocks on AWA rates. Using the methodology of Autor et al. (2013) and a geographic measure at the state and metro-area level, I find that competition shocks causally increase the share of the population employed in AWAs across all contract types, but primarily among Independent Contractors. These findings are the first evidence that trade shocks causally increase AWAs, and are consistent with firms seeking to reduce labor costs in response to a shock.

At the micro-level I find that trade shocks increase the likelihood of manufacturing workers being employed as temporary help workers, consistent with previous research (Dey et al., 2012, 2017), but decrease the likelihood of being employed as independent contractors. This result is consistent with shocked firms reducing labor costs, as independent contractors are paid higher average wages. It may also signify workers becoming Independent Contractors, but being classified as a non-manufacturing worker.

I also test the effect of trade shocks on manufacturing workers' wages, hours, and benefit rates, finding that they increase with trade shocks and over time. This is consistent with the workers remaining in manufacturing being of high type, potentially outweighing the increased AWA workforce. I also test the effect of AWAs on inequality, and find that there is a small but positive association between AWAs and several inequality indices, however it is difficult to assess the counterfactual in this instance.

Overall, I show that in response to wider competition shocks, firms switched some of their workforce into AWAs. However, as firms reoptimize, they may reduce AWAs if they are less productive and attract lower-type workers. It may still be the case that AWAs are particularly bad for workers: conditional on wage income and hours, it appears that AWA workers are more likely to have variable working hours, a potentially important area of welfare. Additionally, AWAs may have detrimental effects on workers careers. Anecdotal evidence suggests that workers on AWAs are less likely to receive promotions (Irwin, 2017), and they appear to receive long-term wage penalties (Dorn et al., 2018). Understanding these dynamic effects and the proper counterfactual for AWAs is an important direction for future research.

[3] See the results in Table 1.

[4] Many Independent Contractors may have high income but low wages if they are paid by 1099 forms. Using "total income" has similar results.

2 What are AWAs?

The notion of non-standard contracting has been studied in a number of contexts. Autor (2001) finds that workers with high ability choose temporary help firms with on-the-job training in order to demonstrate their skills. The expansion of this type of training may explain the large growth manufacturing firms have seen in the "temp" labor force (Dey et al., 2012, 2017). Temp workers being "pre-trained" in the firm's processes could be considered a reduction in hiring costs.

However, training is an unlikely explanation, given that most temporary help firms and staffing agencies cannot train for firm-specific tasks. Relatedly, despite the findings in Katz and Krueger (2016), there has been no aggregate shift towards AWAs since 2005. The 2017 Contingent Worker Supplement showed that *all* forms of AWAs had actually decreased since 2005.

However, the lack of increase since 2005 may be masking an increase in AWAs in manufacturing. Dey et al. (2017) predicted that the share of all temp-agency workers in production would increase. Additionally, when compared to 2005, there appears to have been a 12% increase in the share of all temp agency workers in manufacturing.[5] The overall rate of Temp Agency workers has decreased since 2005, and the overall manufacturing labor force also decreased.[6] This suggests manufacturing firms may be using more temporary help workers or letting go of their non-temporary help employees, a change masked by an overall decrease in non-manufacturing AWA use.

The findings in the 2017 Contingent Worker Supplement have left researchers puzzled by the cause of AWAs: if they were strictly less costly for firms, we would expect a large increase in their use. However, as I discuss in the next section, legal penalties, productivity differences, and type of AWA worker may explain the lack of shift towards AWAs. However, in the short term, shocks may prompt firms to use AWAs. Autor et al. (2013) found that increased trade exposure to China in local markets caused a decrease in the percentage of the population employed in manufacturing.[7] In response to higher import competition from China, manufacturing firms responded with both cost-saving innovation and reductions in their workforces. Firms' desire to save costs suggests higher rates of AWAs, as they are cheaper. (Muhl, 2002) As the firms are able to reoptimize capital, invest in automation (Acemoglu and Restrepo, 2017), or the economy improves, firms will not need to shift workers to AWAs, and may switch their workforce back to "regular" employment.

[5] In 2005, the rate was 69/344 or approximately 20%. The 2017 CWS found a rate of 32.2%, however these numbers are preliminary.

[6] From around 11.5% of the labor force in 2005 to approximately 8.7% in 2015. However, the May, 2017 CWS has a manufacturing labor rate of approximately 10.5%.

[7] The period of analysis deliberately related to China's admission to the WTO in 2001, and the associated expansion in trade. However, it is unclear that China's admission to the WTO substantially accelerated trade levels. See Figure 2.

If firms are using AWAs to reduce labor costs, why not simply cut hours and wages? The results in Autor et al. (2013) suggest that firms *did* do so, primarily by cutting employment. However, firms may still feel restricted in their ability to change hours, wages, and particularly benefits. If firms have an internal payscale, using AWAs could make sense. Goldschmidt and Schmieder (2017)and Dube and Kaplan (2010) both suggest this possibility when examining contracting out workers.

Firms may be legally constrained from cutting benefits (Muhl, 2002). In the U.S., health benefits in particular may drive firms' desire to use AWAs. Dorn et al. (2018) found that contracted out workers receive approximately 2-3% lower pay than non-contracted out workers, a lower penalty than found in Germany (Goldschmidt and Schmieder, 2017). The low wage penalties in the U.S. may be due to differences in employer-provided benefits. If firms feel they need to retain a subset of their workers, but also need to cut benefits without upsetting existing contracts, they may turn to AWAs.

Benefit reduction is also largely consistent with the findings of Autor et al. (2014), who found that workers exposed to trade shocks were more likely to gain public disability benefits, and spent less time working for their initial employer. They also find that workers are more likely to "churn" or repeatedly switch jobs, another key feature of AWA's less attached employment relationship. While Autor et al. (2014) cannot observe contract form, the description of these workers appear similar to AWAs.

Firms may also have "softer" restrictions on changing contract forms. Pedulla (2011) has a good overview of the relevant sociology literature, and suggests there may be negative externalities on employee morale when using AWAs. He finds that firms who use On-Call workers and Independent Contractors have better relationships with their "regular" employees than firms who use employees on fixed-term contracts. Pedulla suggests this difference may stem from workers' belief that the use of temporary employees will lead to elimination of permanent jobs, though these results are endogenous. The externality effects of alternative work and the effect it has on "standard" employees is an understudied area of this field, and may explain firms' lack of interest in these contracts when not exposed to a shock.

This discussion suggests that AWAS, instead of portending a new form of labor relations, may instead be used primarily as a *mechanism* for firms to reduce fixed labor costs in the face of constraints. Nevertheless, AWAs may have externalities. One potential externality is income inequality. Goldschmidt and Schmieder (2017)and Dube and Kaplan (2010) find evidence that domestic outsourcing is partially responsible for increases in wage inequality. Lemieux et al. (2009) show that performance pay contracts will naturally increase wage inequality. AWA contracts may also be less productive than standard contracts. In the next section, I discuss how legal restrictions may result in AWAs having lower productivity when compared to

regular contracting.

AWAs may also be particularly unstable, decreasing worker welfare. Mas and Pallais (2016) find experimental evidence of worker preference for stable 40 hour workweeks.[8] Gibbons and Katz (1991) suggest that workers who are laid off are perceived as lower-type. If AWAs result in more turnover they could reduce workers' perceived ability in the marketplace. Autor and Houseman (2010) have similar findings, showing that temporary job placements reduce earnings and worsen employment outcomes, suggesting there may be dynamic effects to workers entering AWAs. Anecdotal evidence suggests that AWAs may also reduce the possibility for occupational mobility (Irwin, 2017). These results would suggest that it may be more efficient for firms to be able to cut labor costs without using AWAs if it particularly impacts workers' ability to get a promotion.

Technological investments in automation, an issue touched on in Autor et al. (2013), may also naturally induce more AWAs due to the changing nature of work. More recently, Acemoglu and Restrepo (2017) have examined the role that automation plays if robots are competitors for labor, finding that robots can decrease wages.[9] MacLeod and Parent (1999) show that the characteristics of a job can help determine its pay structure. If jobs are becoming more automated, this may increase rates of AWAs at the top and bottom end of the distribution as workers' effort becomes directly observed, or high-level workers are required to perform more complicated tasks.[10] In my analysis I observe changes over a short period (from 1995-2005), so I expect any automation investments will still only have a small effect. In the intervening twelve years, however, higher automation rates may have changed the nature of work in manufacturing firms, causing further increases in AWA rates if automation has made jobs more routine.

In this section, I have outlined some of the research discussing AWAs. In the next section, I outline the legal status of AWAs, and discuss how these rules may affect firms' willingness to use AWAs.

3 Legal Regulations and Misclassification

While researchers may refer to AWAs as a monolithic group, the contract forms are very distinct, both in form and legal status. There is no specific hours rule that determines whether a worker is an employee versus

[8] While Mas and Pallais (2016) primarily focus on scheduling, if workers are risk averse increases in hours variability would be welfare reducing.

[9] Notably, they examine the effect of robots controlling for import competition as in Autor et al. (2013), suggesting that automation investments are not the driving force in my analysis.

[10] MacLeod and Parent (1999) show the optimal contract form under a variety of different output and information structures.

an AWA worker.[11] Instead, a myriad of laws and regulations govern whether a worker is in an AWA, and if they are correctly classified. In the Legal Appendix, I also provide a selection of relevant quotations from laws, NLRB decisions, and IRS fact sheets and rules on 3rd party employers and independent contractors. Data also suggests that firms are not using AWAs as a form of part-time work: the average hours worked across most AWA types remains above 35 hours per week (as shown in Table 1 and footnote 45), meaning that AWA workers are largely full-time employees.

Regulators have focused the bulk of their attention on independent contractors, because they consitute the largest group of AWAs. The Department of Labor, for example, is greatly worried firms "misclassify" workers: claiming a worker is an independent contractor when they are in reality an employee.[12] Firms have a number of incentives to misclassify workers as independent contractors in order to not provide benefits, overtime pay, workers compensation, and bargaining rights. Independent Contractors also pay all employer-based taxes such as Medicare and Social Security. (Muhl, 2002)

A number of different laws and regulations impact misclassification of workers as independent contractors. At the Federal level, the National Labor Relations Act (NLRA) regulates rights to join a union and protected action, the Fair Labor and Standards Act (FLSA), regulates pay and overtime rules, the Employee Retirement Income Security Act (ERISA) regulates retirement benefits and health benefits. The Health Insurance Portability and Accountability Act (HIPAA) also provides some regulations on health insurance provision for private employers.

Generally, as discussed in Muhl (2002), courts will use the "Right to Control": the "*ability* of the employer to take control [of the work process] is sufficient to create an employer-employee relationship." There are several tests to determine whether a worker has been misclassified, and different regulatory agencies will use different tests depending on the statute in question. The "Common Law Test", used by the IRS, determines employee status based on the employer's ability to control the work product, while the "Economic Realities Test" examines whether a person is dependent on the firm for continued employment. (Muhl, 2002) These distinctions generally come into play during legal disputes, when a worker claims they have been "misclassified" as a contractor when they are an employee.

The National Labor Relations Board has recently suggested that misclassification as independent contractors may be a violation of the NLRA. Because "the law does *not* cover...independent contractors,"[13]

[11] The IRS charges employment taxes for all workers, with some exceptions for low-wage household workers and foreign students. In 2018, the threshold for household workers was $2,100, which is below the income of more than 95% of all contract types, so this restriction does not bind. See IRS Publication 926 - https://www.irs.gov/pub/irs-pdf/p926.pdf

[12] See https://www.dol.gov/whd/workers/misclassification/

[13] https://www.nlrb.gov/resources/faq/nlrb#t38n3182

misclassification could result in workers losing their collective bargaining protections. In a recent case, the NLRB used a variety of tests to consider whether FedEx drivers were employees or contractors, including the Right to Control, but also whether employees were required to wear uniforms and had control over their work processes.[14]

While the discussion thus far has focused on Independent Contractors, the other forms of AWAs are subject to similar legal and regulatory restrictions. Temp Agency workers and Contract Company employees are different in that, while they are considered employees, they are not employees of the firm they primarily provide labor for, but instead their services are "contracted out." The staffing agency or contract company is considered the primary employer in many cases. The primary reason to use such a system would be less necessary oversight and lower employment taxes (Muhl, 2002). In instances of underpayment (or non-payment) of employment taxes, "the liability of the employer for employment taxes may shift depending on the type of third-party arrangement."[15] However, the IRS does commonly use the "Common Law" rule discussed in Muhl (2002), meaning that if a third-party does not pay the appropriate employment taxes, the original employer would still be liable.[16]

The NLRB has also vacillated about so-called "joint employer" regulation. In 2015, the "Browning-Ferris" decision established a new standard that "joint employment" should be considered "even when two entities have never exercised joint control over essential terms and conditions of employment".[17] However, in 2017 the NLRB overruled that decision, returning to the previous standard where the firms would be considered "joint employers" only instances where the firm had exercised "direct and immediate" control over the supplying firm.[18]

The pre-Browning-Ferris standard does allow for the firm to exercise routine authority to oversee these types of employees and ensure that the contracted labor is being adequately provided. However, the hiring firm is not allowed to provide day-to-day instruction, discipline, or termination of workers. The change to the Browning-Ferris standard and back again may have changed AWA usage between 2015 and 2017, explaining some of the difference between Katz and Krueger (2016) and the 2017 CWS. However, it is unlikely that firms shifted AWA usage to the extent of 5% of the labor force in response.

[14] FedEx Home Delivery v. NLRB 849 F. 3d 1123 - Court of Appeals, Dist. of Columbia Circuit 2017

[15] IRS Internal Revenue Manual, Part 5, Chapter 1, Section 24. - https://www.irs.gov/irm/part5/irm_05-001-024r

[16] "The existence of an employer-employee relationship generally is determined using the common law control test and is based on the facts and circumstances of each case." IRS Internal Revenue Manual, Part 5, Chapter 1, Section 24. - https://www.irs.gov/irm/part5/irm_05-001-024r

[17] 365 NLRB No. 156 Hy-Brand Industrial Contractors, Ltd. and Brandt Construction Co.,

[18] "[t]he essential element in [the joint-employer] analysis is whether a putative joint employer's control over employment matters is direct and immediate" - 365 NLRB No. 156 Hy-Brand Industrial Contractors, Ltd. and Brandt Construction Co.,

There are also substantial regulations surrounding the provision of employee benefits. Under the original HIPAA/ERISA rules, firms that offer health and retirement benefits must provide the *same benefits* to "similarly situated individuals."[19] This means that firms who offer benefits to a given class of worker (by occupation, tenure, job title, etc.) must offer the same benefits to all workers in the same class. Therefore, a firm with two classes of employee, say laborers and managers, can offer two separate benefits programs to each type, but must offer the same benefits within them. While this regulation was primarily created to prevent firms form discriminating on the basis of pre-existing conditions, it also restricts firms' ability to cut benefits for a single employee. In practice, if the cost of creating a benefits plan is high, firms may prefer to offer a single plan to all employees.

There are a number of costs associated with hiring employees, from employment taxes to restrictions on benefits. By using an AWA, a firm can effectively shift these costs to the worker (Independent Contractors) or a different firm (Temporary Help Agencies and Contract Companies). Additionally, they would be able to avoid cutting benefits for the remaining employees. While the firm may need to pay a wage premium, they can more flexibly respond to a higher wage by contracting for fewer hours. Despite these benefits most firms will not "cheat" and misclassify workers: if caught they can pay severe penalties.(Muhl, 2002)

The restrictions on firms' oversight of employees also suggests that using AWAs may reduce productivity. If firms are only allowed to exercise "routine authority" in the case of joint-employers or cannot control the work process, it may result in productivity declines, as the firm cannot easily reassign workers or provide oversight. Instead, they are generally only allowed to contract on the quality or outcome of service. This potential productivity decline, as well as the potential increase in legal liabilities, may also explain the lack of increase in AWAs.

These regulations provide the basis of my conceptual framework, which I discuss more in depth in the following section. In the context of a trade shock, where firms wish to reduce labor costs, high fixed costs may lead to inefficiently high levels of unemployment. Firms will use AWAs to pay lower fixed costs (including benefits) and hire an additional worker. However, that worker may of lower-type and the AWA contract is less productive. This also suggests that more recent regulations, such as the Affordable Care Act (ACA), may have naturally induced lower usage of AWAs. If the primary reason for AWAs is to reduce costs of employee healthcare, a firm using a large number of Temporary Help workers may decide to hire those workers themselves, as the Temp Agency would likely raise costs due to needing to provide healthcare. This

[19]Health Insurance Portability and Accountability Act of 1996 - https://www.gpo.gov/fdsys/pkg/PLAW-104publ191/html/PLAW-104publ191.htm

would reduce AWA rates.

In the following section, I outline my conceptual framework using the legal restrictions around contracting rules to show why firms may not prefer AWAs generally, but could use them in response to a shock.

4 Conceptual Framework

4.1 AWAs as a Reduction in Fixed Costs

The key difference difference between AWAs and other forms of employment, as discussed in Section 3 is primarily a legal one. I outline a simple framework suggesting why we would observe higher rates of AWAs in response to a competition shock.

The key is that firms would like to reduce costs in response to the trade shock. However, they may face a productivity penalty or due to legal constraints around benefits are unable to cut costs without using an AWA.

I write a simple firm-optimization model that illustrates this idea. There is a single firm with one employee. The firm sells its good to the global market, with an exogenously determined price p and wage levels contingent on ability $w(\alpha)$, where α is the observed ability of the employee. Wage is strictly increasing in α. The firm optimizes over the hours of its worker and offers a contract for a benefits package and number of hours at the market wage.

The firm maximizes:

$$max_h \Pi = pf_f(\alpha, h) - w(\alpha)h$$

f_f is the production function of the good where the worker is under a standard employment contract, where $\frac{\partial f_f}{\partial h}, \frac{\partial f_f}{\partial \alpha} > 0$, $\frac{\partial^2 f_f}{\partial h^2}, \frac{\partial^2 f_f}{\partial \alpha^2} < 0$.

w and h are the agreed upon hours and wages (including benefits) of the worker. I assume that the worker faces a constraint, with the outside option $\bar{U}(\alpha)$ increasing in ability. If the income (including benefits) of the worker is not high enough, they will not accept the firm's contract.

The firm optimizes over hours and selects:

$$\frac{\partial f_f}{\partial h} = \frac{w(\alpha)}{p}$$

However, legal rules dictate that the firms must pay a fixed cost per-employee F. We can think of this fixed cost as the cost of providing a benefits plan (health and retirement) to each employee, as well as any employment taxes. Thus employers will receive:

$$\Pi = pf_f(\alpha, h^*) - w(\alpha)h^* - F$$

Firms will in reality have multiple employees, and pay varying fixed costs for groups of workers in "similarly situated" positions as defined by their employment status, and employment taxes will vary with wages and turnover rates.

4.2 Effect of a Competition Shock

Now, assume that the firm is hit by a shock that reduces the price of their output good from p to $p_s < p$. Also assume that the firm is small and is the only shocked firm, so the wage level does not change in the local market. The firm will seek to reoptimize the number of hours and will receive profit:

$$\Pi = p_s f_f(\alpha, h_s^*) - w(\alpha)h_s^* - F$$

Where h_s^* is determined by the optimization equation above. Since the worker's ability has not changed, and the wage is exogenous, the worker will receive strictly fewer hours than previously. However, with high enough fixed-costs F and low enough p_s, we may have:

$$p_s f_f(\alpha, h_s^*) - w(\alpha)h_s^* - F < 0$$

It may also be the case that the outside option of the worker is such that the firm cannot afford to reduce their hours to the new efficient level without losing the worker, and needs to offer a similar number of hours if their worker is high-type.[20] In this instance we would have:

$$p_s f_f(\alpha, h^*) - w(\alpha)h^* - F < 0$$

In either case, the firm needs to further reduce costs.[21] In practice, this will depend on the values of the

[20] The better outside option of the high-wage workers is supported by Chetverkov et al. (2016).

[21] While I am purposefully abstracting away from type-dependent fixed costs, in practice firms may be unable (or unwilling) to shift low-type workers to part-time work. As discussed, the majority of workers under most AWA contract types work full-time, meaning the equilibrium hours for these workers is high enough that classifying them as "part time" may run afoul regulators.

variables in question and the outside option. However, I observe that wages in manufacturing increased in response to the shock, suggesting that high-type workers are remaining, consistent with Chetverkov et al. (2016) where high-types do not appear to be as affected by the trade shock.

4.3 Usage of AWAs

The firm is now making negative profits and needs to reduce labor costs. This result is inefficient and driven by fixed costs. The firm would prefer to stay in business at the lower level of hours. The worker may also prefer to stay employed at fewer hours, especially if the market now perceives them to be of lower type than before (Gibbons and Katz, 1991), or if would lose firm-specific human capital if unemployed.

In the data we observe that more than 72% of Temporary Help, Contract Company workers, and Independent Contractors are considered "Full Time". While this is slightly lower than non-AWA contracts,[22] it is still similar to standard employees. Additionally, median hours worked is still 40 hours per week across contract type, with the mean hours worked above 35 hours per week for all but On-Call workers. This suggests that most AWA employees are full-time workers. On Call workers could be used instead of a part-time contract.

While firms could legally cut benefits if they have a single employee, in reality they would be restricted from doing so. If a firm has multiple employees, cutting benefits for one may not be legal under HIPAA/ERISA rules if there is another "similarly situated" worker.[23] However, at a lower level of hours and benefits the firm still has to pay employment taxes on all employees above a low income threshold ($2,100 in 2018), which may still result in higher fixed costs than the firm can afford.

The firm can instead use an AWA which allows them to offer a smaller benefits package in order to reduce fixed costs, and not pay employment taxes. However, there are downsides. The firm cannot properly "control" or assign the worker on a given day unless they wanted to be considered a joint employer (Temp Agency and Contract Company) or were misclassifying the worker (Independent Contractors). This results in AWAs having lower productivity function f_a for a given hour of work and ability of the worker α: $\frac{\partial f_a}{\partial h} < \frac{\partial f_f}{\partial h}$ $\forall(h, \alpha)$. However, the firm no longer has to provide benefits or employer taxes, and pays fixed costs $F_A < F$. The firm hires a new worker with ability α_i, and receives:

[22] 82% of "Regular" contracts are considered full-time.

[23] Firms who *are* legally capable of reducing benefits for a group of workers may also find that expensive. Introducing a separate health plan with lower benefits may have high fixed setup costs. AWAs would allow for firms to pass off any setup costs.

$$\Pi_s = p_s f_a(\alpha_i, h) - w(\alpha_i)h$$

subject to the same optimization equation:

$$\frac{\partial f_a}{\partial h} = \frac{w(\alpha_i)}{p_s}$$

Because $\frac{\partial f_a}{\partial h} < \frac{\partial f_f}{\partial h}$, if $\alpha_i = \alpha$, optimal hours for the AWA worker would be lower compared to the non-AWA case. However, if the firm cuts benefits it will likely be that $\alpha_i < \alpha$, due to the lower benefits rates, increasing equilibrium hours.[24] If we have that:

$$p_s f_a(\alpha_i, h^*_{sa}) - w(\alpha_i)h^*_{sa} - F_A > 0$$

The firm will find it profitable to use an AWA. Where h^*_{sa} is the optimal hours for the AWA worker under the shock. Thus, in the case of a shock, the firm needs to use an AWA to reduce fixed costs, but suffers lower productivity due to not being able to properly oversee the worker. Additionally, the new worker is likely of lower type, as evidenced by willingness to accept a lower benefits package.

This demonstrates why, in the absence of a shock, firms will prefer standard contracts to using AWAs. Prior to the shock, the additional profit from the higher level of productivity from exercising control over higher-type employees exceeds the difference in fixed costs and wages, i.e.

$$pf_f(\alpha, h) - w(\alpha)h^* - F > pf_a(\alpha_i, h^*_a) - w(\alpha_i)h^*_a - F_A$$

If we have that p is high, or the difference between F and F_A is very small, this inequality will hold. For simplicity, assume that $h^*_a = h^*$, we will have:

$$p(f_f(\alpha, h) - f_a(\alpha_i, h^*_a)) > h^* \left[w(\alpha) - w(\alpha_i)\right] + F - F_A$$

So if the wage difference between the types in each instance is small, the fixed cost difference is small, or the productivity difference weighted by the price is high, the firm will prefer to have its own employees rather than an AWA.

[24] The data suggests that AWA workers work very similar hours per week to standard contracts, suggesting a combination of these two effects.

Under the lower price of p_s however, again assuming that post-shock the hours of AWA and non-AWA workers are the same, we will have effectively lowered the left-hand side of the equation, and the productivity advantage of regular work may no longer outweigh the cost-savings of an AWA employee. Additionally, if the difference in productivity is sufficiently low then using an AWA may be strictly cheaper for the firm. For certain tasks, such as security work or janitorial services as in Dube and Kaplan (2010), there may be no productivity declines in using AWAs.

This framework suggests that firms will primarily use AWAs in the specific case where the fixed costs savings of AWAs outweigh the potential benefit of hiring their own employee. While I have not mentioned that the firm would likely pay a wage premium for their contract or temp-agency workers, that higher wage is more easily optimized for firms (by having lower worker hours). A wage premium for AWAs would also decrease the cost-savings via wages.

4.4 Discussion

This framework illustrates the role that legal requirements and fixed costs play in determining whether an employer will use AWAs. After a price reduction, the firm wishes to reduce costs. While the firm wishes to reduce hours, that may not be enough to remain profitable, and it must also hire some workers in lower fixed-cost contracts. This framework can also be easily extended to include multiple employees. If the equilibrium number of hours for a worker may still be too high to qualify as a separate class of employee, making it impossible to cut benefits. If a firm has multiple employees, cutting benefits for some employees could be illegal if workers are "similarly situated". The firm would be additionally restricted from cutting benefits within a certain class of worker.

This framework also illustrates the importance of the "right to control" in determining productivity. As some of the language in the Legal Appendix shows, the right to control can include simple factors such as assignment and discipline of a worker. While there is some allowance within these regulations, firms legally lose the ability to direct their workers under AWAs.

This framework did not include unemployment and average hours increases, but can easily do so with a firm that has multiple employees. If the employer has N employees of various types, lays off the $N-1$ lowest types, and hires a single AWA employee, this would reduce overall employment, but may increase average wages. The increase in wages, however, is solely due to the changing type composition of the remaining workers (one low-type AWA and one standard high-type employee).

While I suggest firms are using AWAs to reduce fixed costs of employment, it not the only story. AWAs

can also be used for flexibility reasons or for firms to discover the type of the employee before committing to hiring them. (Autor and Houseman, 2010) Firms may also prefer to use AWAs only for specific types of work that require little oversight, or are very technical.(MacLeod and Parent, 1999)

It also suggests that firms are not "skirting the rules". They do use AWA workers, however those workers may be of lower type than the previous employees and willing to accept lower pay and benefits. Additionally, the inability to oversee workers may make AWAs less productive. Nevertheless, the firm still has some incentives to misclassify. If the firm is willing to face legal penalties, it can "control" AWA employees fully and not suffer a productivity disadvantage. Additional legal protections at the state level and circuit court decisions may therefore play a substantial role in AWA use. For example, in places with strong labor protections we may see an increase in AWAs after a shock, followed by a decline if the court determines workers were unreasonably considered AWA employees. If a state has fewer protections, the new AWAs may stick around.

One important assumption is that the firm offers a wage exogenously determined by observed worker ability type. This assumption is not necessarily reasonable, and may result in AWAs having additional downsides that regular contracting does not. If firms are wrong about their belief of a worker's type, AWAs may mean they do not update their beliefs on a specific worker. That worker may not receive a promotion they would have gotten if they were hired regularly.[25]

Finally, in this framework, AWAs are efficient. While there is a loss in productivity due to contract form and a reduction in worker type, that worker would in theory be unemployed were it not for AWAs. If firms are primarily using these contracts in instances where they have no other option, they would be strictly welfare increasing. However, if firms are replacing standard contracts with AWAs, they are reducing productivity.

In this section, I have discussed the conceptual framework for AWAs. In the following sections I will outline my data and methodology that I use to test whether competition shocks increase AWAs.

5 Data

For my analysis, I only discuss workers in the following contract types, however there may be other types of AWAs.

[25]Irwin (2017)is an example of anecdotal evidence that AWA usage, in this case contracting out, reduces within-firm upward mobility.

1. Contract Companies (0.4% of sample, 5.3% of AWAs)[26]
2. Workers employed by Temporary-Help Agencies (0.7% of sample, 8.3% of AWAs)
3. On-Call Workers (1.4% of sample, 17.7% of AWAs)
4. Independent Contractors (5.4% of sample, 69.0% of AWAs)[27]

These are the primary definitions used by the Contingent Worker Supplement (CWS), and make up the vast majority of AWAs observed.[28] This is not the universe of AWA contract forms, which can include day laborers, workers who are hired to be temporary replacements (normally in cases where someone is on maternity leave), Contract Company employees who work for multiple employers, and workers under fixed-length temporary contracts.

There is debate about whether or not to include seasonal workers and self-employed persons, as the nature of their contracts is theoretically similar to those who are employed in fixed-length contracts.[29] I do not include seasonal work because the lack of attachment is job, rather than contract, related. I do not include self-employed persons because I do not believe owners of businesses do not face the same incentives. However, it may be the case that self-employment is a proxy for AWAs, since some research has suggested self-employment is associated with higher rates of entry to AWAs.[30]

Additionally, Temporary-Help work is generally under-reported in the CWS relative to other data sources (Dorn et al., 2018), likely due to mis-reporting of the client rather than the "employer" of the temporary help agency. I do not anticipate that this would bias my results as a constant underreporting rate would still pick up the effect of any change. For similar reasons, we might also expect that Contract work is underreported, especially if workers are unaware of their contract status or are contracted to multiple employers. For this reason, we cannot assume that Temporary Help work and Contract work only combine for 1.1% of the labor force, and any interpretation of results should be with this underreporting in mind.

[26]Defined as workers who primarily work offsite for a single employer, which may underestimate contracted out employees. For example, many firms have outsourced security work to security "firms" (Dube and Kaplan, 2010), who may work at multiple sites.

[27]Note: The X% of sample calculations includes persons not in the labor force, and is pooled over the years of the CWS: 1995, 1997, 1999, 2001, 2005.

[28]These categories are determined by the CWS recode variables "PRCNTRCT", "PRTMPAGC", "PRCALL" and "PRIC", which are equal to 1 if a worker is classified as one of these workers.

[29]i.e. persons whose contract lasts for a fixed length of time.

[30]As a robustness check, I find that including self-employed persons only finds larger predicted effects of competition shocks at the state level.

I choose these categories because they represent the four largest non-standard contract forms in my sample, and are the most commonly used in the literature. It is also important to note that the interpretation of my findings at the state level is based on the share of these contracts as a percentage of the working age population. Thus, we can also interpret my results as the effect of competition shocks on the share of the population in the several contract types I list above, which are still the largest groups of non self-employed AWA contracts other researchers have observed.[31]

5.1 County Business Patterns

A substantial part of the data used in this analysis is from the County Business Patterns (CBP), a census survey of businesses that is performed in March of each year to determine the amount of employment at the county-industry level in the United States. County-level data going back to 1986 are available online, and provide the employment level in each industry that is used in this analysis.

From 1986-1997, the CBP used a consistent scheme with the Standard Industry Classification (SIC) codes. From 1998 onwards, the CBP switched to the NAICS industry codes. In many cases, the employment levels in these data are given by ranges for privacy reasons. I therefore use the "imputed employment" measure from Autor et al. (2013). This methodology uses regression analysis to impute the employment rates in each industry-county combination based on these ranges. This methodology allows me to establish a measure of the total employment level for each industry-county combination, and aggregate at the State and Metro Area level as necessary. Their methodology also creates a weighted crosswalk between SIC and NAICS codes. I adapt code used to create the imputed employment data from code made available by David Dorn on his website.[32] For this paper I use the years: 1986, 1989, 1990, 1991, 1995, 1997, 1999, 2000 and 2001.

5.2 Trade Data

I use cleaned trade data from 1991 to 2007, available from David Dorn's website. This data contains the value of trade by SIC code from a number of countries to both the United States and a list of high income countries: Australia, Denmark, Finland, Germany, Japan, New Zealand, Spain, and Switzerland. The data is cleaned by the methodology in Feenstra et al. (2005). I use the data from the years 1995, 1997, 1999, 2001, and 2005 in order to construct my change-over period measures of the change in trade value.

[31] See Bernhardt (2014)and Katz and Krueger (2016).
[32] http://www.ddorn.net/data.htm

5.3 Routine Tasks

I use data on routine tasks following the methodology described in Autor and Dorn (2013). Using the definitions in the 1980 Occupational Handbook, the authors provide a score from 0 to 10 of the degree of which an occupation might be more easily replaced by computerization. This provides a natural starting point for the discussion of any potential effect of automation and the role that AWAs play in workers' jobs being "routine".

5.4 Current Population Survey

Important to my analysis is the CPS' micro-data from February of 1995, 1997, 1999, 2001, and 2005. These were the years the CPS included the Contingent Worker Supplement, and includes the relevant questions from the CPS about contingent work status and contract type. The questions on work status and contract type were downloaded from the National Bureau of Economic Research, and matched to the same dataset from IPUMS in order to facilitate linkages and cleaning. Additionally, I linked these datasets with both the American Community Survey yearly supplement as well as outgoing rotation group information to collect data on income, hourly wages, and benefits information. I use these linkages to create the descriptive results in Section 7.1. I also use the CPS data to construct controls for the state-level regressions.

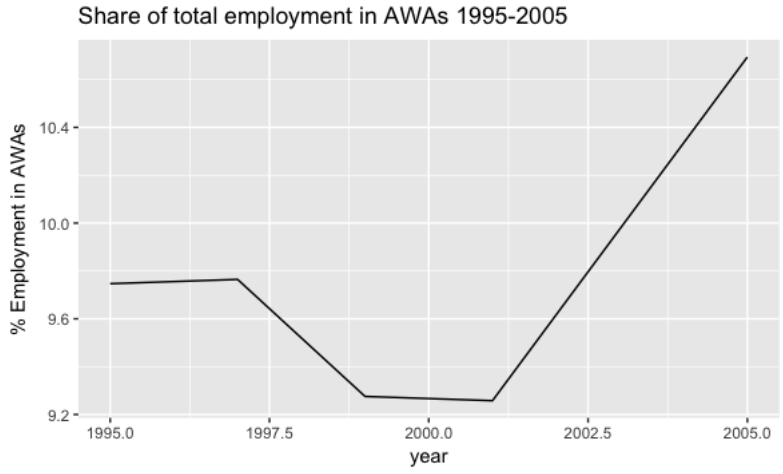

Figure 1: Share of Employment in Alternative Work Arrangements 1995-2005

As shown in Figure 1, the total share of AWA workers did not vary much over this time period, hovering

between 9.25% and 10.69% of employment.[33] While there was an increase of 1.4% between 2001 and 2005, the increase since 1995 is less than a 1% shift in the share of employment, which is within the range that we may expect random variation to occur. However, the increase does occur between 2001 and 2005, which is the time period immediately after China joined the WTO.[34]

This is a small change over a the relatively short time period, and suggests my finding that competition shocks cause higher rates of AWAs is not coming from an aggregate shift or technological change, but instead measures the impact of the competition shock. If competition shocks increase the usage of AWAs more than the 1.4% we see between 2001 and 2005, it would also provide evidence that non-manufacturing firms may be laying off people in AWAs or hiring laid of manufacturing workers in non-AWA jobs. This add-on effect of trade shocks is an area worth exploring in later work.

The IPUMS CPS data is also used in order to create the geography for the micro-level analysis outlined in 6.1.3. I follow the 1990 county-level construction listed on the IPUMS-USA website[35] to create a consistent geography to link workers. This also means that if there are heterogeneous treatment effects in urban versus rural areas I will not be able to observe them in my micro-level results.

5.5 Inequality Data

I use data on U.S. state-level inequality from Mark W. Frank to whether changing the share of workers in AWAs has effects on inequality.[36]The data is created using U.S. tax records, which means the measures underestimate inequality due to truncation of data at the low end of the distribution.(Frank, 2014) There are a number of possible income inequality measures, however I only examine the effect of AWAs on the share of income going to the top 5% and 1% of the distribution, as well as the Theil and Gini indices of inequality.[37] The Theil and Gini indices and their various downsides are discussed in more depth in Frank (2014).

My framework predicts that an increase in AWAs will somewhat increase inequality. This finding is already supported in the data by Dube and Kaplan (2010) and Goldschmidt and Schmieder (2017) who both find that contracting out (a form of AWA work) increases inequality. However, this could be due to

[33]These percentages were calculated using the CPS Supplement weights provided with each year's CWS, as a share of total employed persons in the supplement.

[34]It is obviously possible that firms are reducing employment in non-AWAs, which would increase AWA share of employment mechanically. For that reason, I examine the share of the *population* in AWAs, which would not be affected by a mechanical increase in unemployment.

[35]Found at - https://usa.ipums.org/usa/volii/county_comp2b.shtml#balt

[36]http://www.shsu.edu/eco_mwf/inequality.html

[37]Using other inequality indices does not substantially alter my results.

wage reductions from the trade shock. If the counterfactual is that workers would be otherwise unemployed, AWAs could reduce inequality, as in Lemieux et al. (2009).

6 Methodology and Identification Strategy

6.1 Effects of Trade Shocks

6.1.1 State-Level Changes

My methodology utilizes that of Autor et al. (2013). I follow their model of a number of open-economy regions i with monopolistically competitive firms producing either differentiated traded goods or a homogenous non-traded good. The expected effect of trade shocks will be proportional to the region-employment weighted effect of the trade shocks. Notably, their model does not account for increased exports from the U.S. to China or increased competition for U.S. goods in foreign markets. However, as Autor et al. (2013) state, the export market to China is much smaller than the import market to the U.S. and the vast majority of U.S. manufacturing is for domestic consumption.

They analyze the effect of the per-worker change in import competition at the commuter-zone level, weighted by the employment levels in that industry. Their main equation of interest is:

$$\Delta L_{it}^{m} = \gamma_t + \beta_1 \Delta IPW_{uit} + X_{it}\acute{}\beta_2 + e_{it} \tag{1}$$

Where ΔIPW_{uit} is the per-worker change in import levels from the beginning of the period to the end of the period, given by the following formula:

$$\Delta IPW_{uit} = \sum_{j} \frac{L_{ijt}}{L_{it}} \frac{\Delta M_{ucjt}}{L_{jt}} \tag{2}$$

L_{ijt} is the employment in area i in industry j, L_{it} is the total employment in area i , and L_{jt} is the national employment level in industry j, all at the start of period t. ΔM_j is the change in the value of total imports in industry j from China to the United States between the start and end of period t . X_{it} is a matrix of controls, including the share of the population in manufacturing at the beginning of period $t$and the share of the population in routine tasks.

Obviously, there is omitted variable bias. If the additional import competition results in supply-side decisions by U.S. firms to cut jobs, we will be picking that up in the regressions and could underestimate any results. Therefore, the authors use a novel instrumental variable strategy, instrumenting ΔIPW_{uit} with ΔIPW_{oit}, where ΔIPW_{oit} is given by the following formula:

$$\Delta IPW_{oit} = \sum_{j} \frac{L_{ijt-1}}{L_{it-1}} \frac{\Delta M_{ocjt}}{L_{jt-1}} \tag{3}$$

L_{ijt-1} is the employment in area i in industry j , L_{it-1} is the total employment in area i , L_{jt-1} is the national employment level in industry j all the start of period $t-1$. ΔM_{ocjt} is the change in total exports in industry j from China to the the ten other high income countries between the start and end of period $t-1$.

This is a valid instrument. For the relevance condition, there should be a relationship between Chinese exports to the United States and Chinese exports to other high income countries because of the overall increase in China's export market over the past 30 years. I additionally show the first stage regression coefficient and standard error and ΔIPW_{oit} is highly significant.

For the exogeneity condition, we do not expect that U.S. firms will be making local labor market decisions in response to import shocks in other countries. Again, this may not strictly be true depending on exactly what the industry in question is, but as stated above, the export market is not the primary market for U.S. manufacturing, and it is unlikely they would be directly competing with Chinese trade goods even when exporting. Therefore, ΔIPW_{oit} satisfies the exogeneity condition and is a valid instrument.[38]

Recent econometric literature into the shift-share design of the trade shock suggests that the exogeneity condition holds if the "growth of Chinese import competition measured outside the U.S. must be systematically different for industries concentrated in regions where employment is falling for other reasons." (Borusyak et al., 2018) While this literature is still in the early stages, this condition is likely to hold at the state-level, where industry concentration is less pronounced and employment shifts are smaller than the commuter-zone level.

There is also some concern about "bleed over" between geographic areas. Namely that import shocks to one area could affect a nearby area simultaneously. For this reason, Autor et al. (2013) do their analysis at the "Commuter-Zone" level, 722 aggregations of counties which make up the mainland United States and have strong economic and commuting ties between them. They also use the import changes from 1990 to

[38]The expected direction of the potential bias means OLS will underestimate any coefficients. Running my analyses via OLS has statistically significant results with somewhat smaller coefficients, consistent with expectations, and suggesting any endogeneity bias is minimal.

2000 and 2000 to 2007. They chose this period because it allowed them to analyze data both before and after China's admission to the WTO, which coincided with a substantial increase in import shocks as seen in Figure 2 (taken from Figure 1, Autor et al. (2013)).

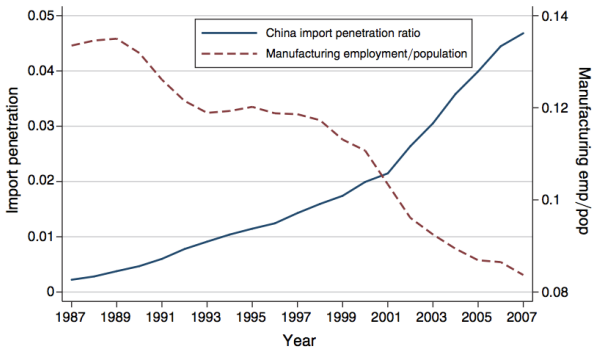

FIGURE 1. IMPORT PENETRATION RATIO FOR US IMPORTS FROM CHINA (*left scale*), AND SHARE OF US WORKING-AGE POPULATION EMPLOYED IN MANUFACTURING (*right scale*)

Figure 2: Change in Import Penetration, Figure 1 from Autor et al. (2013)

Due to data constraints, I slightly modify the methodology in Autor et al. (2013). The CPS' Contingent Worker Supplement was only run in 1995, 1997, 1999, 2001, and 2005, thus I cannot line up my analysis to the same years as Autor et al. (2013). Additionally, the CPS data only began providing county-level data in 1997 - and even then for only certain larger counties. Therefore, for the aggregate-level, analysis I will instead estimate a similar regression as Eq. 1.

$$\Delta AW_{it} = \gamma_t + \beta_1 \Delta IPW_{uit} + X_{it}{}'\beta_2 + e_{it} \tag{4}$$

The periods t are 1995-1997, 1997-1999, 1999-2001, and 2001-2005, and the geographic unit i will be at the *state*-level for the United States, where 2 and 3 provide the formula for the variables of interest. I have a total of 192 datapoints in this regression (48 mainland states over four periods). ΔAW_{it} is the change over the period in the share of the working age population employed in Alternative Work Arrangements. X'_{it} includes a number of controls as stated above.[39]

The controls of percentage foreign born, college education, and share of women at work, are calculated

[39]I use a linear time trend (defined as years since 1995 at the starting of period t) rather than an indicator for whether the shocks happened after the WTO, since any year indicator will reduce the amount of state-year variation I have with only 192 datapoints. Additionally, it is unclear whether China's admission to the WTO substantially altered the trend in trade, as shown in Figure 2.

using the CPS survey data of the entire population for a given state in Feburary of the year in question, using the weighting scheme provided by the CPS at the national level. For percentage of workers in routine tasks, I averaged the same share over all months of the data in question in order to ensure enough data surrounding occupations and remove seasonal effects. The share of the workforce in manufacturing is calculated using the Current Business Patterns, while the change in the manufacturing share is calculated using CPS survey data.

The left hand side of each regression is the change from the beginning of the period to the end of the period of the percentage of the *working age population* in AWAs. All analyses for the calculation of shares were done using the supplement weights of the Contingent Worker Supplement.[40] The AWA share in each state is calculated as the number of AWA workers divided by the number of people who were involved in the Contingent Worker Supplement (defined as those with supplement weight greater than zero). This includes people not in the labor force to get a reasonable share of AWA rates in the population.

Using the percentage of AWAs as a percentage of the state-level working age population also ensures that this analysis will determine whether competition shocks increased AWA usage, rather than being a mechanical result from reduced employment due to the trade shock. However, we will not be able to determine whether the effect was primarily focused in shocked industries or resulted in workers shifting into AWA work in non-manufacturing.[41]

6.1.2 Effect of AWAs on Inequality

To test the effect of AWA rates on inequality, I run the following regressions, using the state-level changes in AWA rates and the various inequality measures.

$$\Delta Ineq_{it} = \gamma_t + \beta_1 \Delta AW_{it} + \beta_2 \Delta L_{it}^m + X_{it}' \beta_3 + e_{it}$$

Where $\Delta Ineq_{it}$ is the absolute change in one of the four inequality measures[42], and the other terms are described above. I will use the same controls as the final equation in estimating the effect of trade shocks.

I also provide the same regressions with the change in specific share of AWA work, to see which contract forms have the largest inequality effects. My model predicts that higher AWA rates will result in higher

[40] The choice of weighting scheme does not materially affect my results.

[41] I also provide results at the state-level broken out by contract type. However, as shown in Table 1, the number of observations in certain contract types is relatively low. This may result in noisy estimates of the population in a given contract at the state-level. I do not anticipate that this would bias my results in a particular direction.

[42] Top 5%, 1% of the income share and the Theil and Gini Indices.

inequality.

If there are any trends during this period that would be correlated with decreased inequality and increased AWA share I would be underestimating inequality results. One example of such an effect would be the high overall growth rates in this period. While this could have led to more jobs and less inequality, if these were driven by ICT investments we would have downward bias.

Because we expect the change in AWA share to be downwardly biased, I instrument for ΔAW_{it} with ΔIPW_{uit}.[43] I show in Section 6.1.1 that the relevance condition holds, this will be a valid instrument if $Cov(e_{it}, \Delta IPW_{uit}) = 0$. However, it is unlikely that the higher level of competition from China had a *direct* effect on inequality. Instead, it would operate entirely through the *indirect* labor effect of shifting workers to AWAs and non-manufacturing jobs, and the correlation between the error term and the competition shock is likely to be zero, especially when controlling for the change in state-level manufacturing share.

I report the results using both OLS and IV estimates for robustness purposes. However, I expect that inequality has increased with AWAs. I also expect that the effect would be relatively minor, given the small share of AWAs.

6.1.3 Manufacturing Workers - Micro Level

While the CPS does not include sufficient county-level information to provide an analysis on the commuter-zone level, IPUMS does provide the metro area respondents live in. Using IPUMS' 1990 definition of each metro area, I create a consistent list of the counties that, when combined, aggregate to each metro area. While there were some changes in which counties were included in metro areas in later years, I keep a consistent geography from the 1990 period onwards, in order to have a constant like-to-like estimate of the trade shocks per-worker.

I create a crosswalk between the listed counties and their associated metro area. Some constructed metro areas (specifically the areas around Boston, MA and all of Connecticut) are very large geographicallys. This is because the metropolitan areas are defined using parts of various counties. In order to make sure that the correct people were assigned to the correct metro areas, any metro areas with "partial" counties were aggregated into a single larger area. While choosing to aggregate in this manner is not ideal due to loss in variation, other researchers (including Autor et al. (2013)) have similarly aggregated all of Connecticut into a single "Commuter-Zone", and it should not bias my results.

[43] Instrumenting for both ΔAW_{it} and ΔL_{it}^{m} with the two trade shock measures leads to similar point estimates as only instrumenting for ΔAW_{it}, but the results are insignificant due to higher variance with an additional instrument.

Finally, I take the full list of metro areas in the IPUMS data, and provide a link to the relevant metro area that was "constructed" from the various counties. This allows me to link each individual worker in the micro-data to the weighted trade shocks per worker.[44] These linkages exploit additional variation from the metro-area that is lost when aggregating to the state level.

IPUMS also provides worker industry, which allows me to exploit an additional level variation: the industry-metro-area trade shock. While Eq. 2 has the change in import levels per worker, aggregated across all industries in a certain area, we can link some workers in each industry to their *specific industry*-metro area's trade shock. I use a crosswalk between the 1990 census codes used in the IPUMS data with the industry codes used in the trade shock and CBP data, which results in 20 aggregated manufacturing industries per metro area at the 2-digit SIC code.

Due to data limitations, I cannot use the 10-year change in trade levels as in Autor et al. (2013). Instead, I use the 5 year change. Therefore, a manufacturing worker who was interviewed in 2001 from metro area i industry j will have the "personal" trade shock of:

$$\Delta IPW_{uitj} = \frac{L_{ijt}}{L_{it}} \frac{\Delta M_{jt}}{L_{jt}}$$

Where L_{ijt} is the employment in area i in industry j , L_{it} is the total employment in area i , and L_{jt} is the national employment level in industry j, all at the start of period t(in this case 1996). ΔM_j would be change in total imports in industry j from China to the United States between 1996 and 2001. The trade data begins in 1991, so for workers interviewed in 1995 I instead use the four-year change between 1991 and 1995.

With metro-area trade shocks, there is additional variation coming from manufacturing workers in the same area being exposed to different levels of a trade shock. A tobacco manufacturer in the Dallas-Fort Worth area may not be exposed to the same level of import competition as a steel worker in the same area.

For similar reasons as in Autor et al. (2013), we might expect workers in more exposed industries to shift away or be laid off from those industries. Because of this supply-side effect, I also instrument for the per worker industry-metro area import shock with the same shock using Chinese exports to other high income countries. I use the 10-year lagged employment as weights, as in Autor et al. (2013), except for 1995, where I use 1986 as the lagged weight due to data constraints. Using the occupation codes listed in the IPUMS data, I can also determine whether a worker is employed in "routine" activity, as defined in Autor and Dorn

[44]For Temp-Agency workers and Contract Company workers, I use the CWS' questions on client industry to determine their trade shock level.

(2013).

With these data, I estimate the following regression:

$$AW^{m}_{citj} = \gamma_t + \beta_1 \Delta IPW_{uitj} + X_{it}{}'\beta_2 + e_{itj}$$

Where we instrument ΔIPW_{uitj} with ΔIPW_{oitj} (which is constructed similarly), and AW_{itj} is a dummy which equals one if a worker in metro area i at time t in industry j is an AWA worker in contract type c. I do this regression in order to separately identify the effect that trade shocks may have had on separate contract forms. I expect that (consistent with Dey et al. (2012, 2017)) we will see that competition shocks increase the likelihood of workers being employed by temporary help agencies, but we have no prediction on the effect for other AWA forms.

As a robustness check, I also use the Newey (1987) two step estimator of IV regressions in probit models. Using this methodology does not substantially affect my results, with some results that were statistically significant at the 5% level becoming statistically significant at the 10% level.

I will also estimate the effect of trade shocks on other variables, including wages, usual hours, education, and hours variability, to see the effect of trade shocks on workers' wages and hours. I predict that, conditional on changing contract type, the *remaining* manufacturing workers after a shock will be of higher type, and will make higher wages than their peers who have been exposed to lower shocks.

In this analysis, it is important to remember that I am not estimating the effect on AWA *share* at the metro-area level, because the individual cells for a given AWA contract will be extremely small. Instead, I am estimating the effect that a higher competition shock has on a given worker's *probability* of being in an AWA, conditional on being in manufacturing. Controlling for state also does not impact my results.

7 Results

7.1 Descriptive Statistics

I will first provide a table of means showing both that workers in various alternative work arrangements appear to be different from "regular" employees, and vary substantially by contract form. These results are shown in Table 1.

Table 1 shows that there is substantial variation across contract type. The first obvious sign is that Contract workers appear to have higher wage income than all other employment types, including regular

employees, and appear equally likely to receive employer-sponsored health insurance. This is not consistent with prior research (Dube and Kaplan, 2010; Goldschmidt and Schmieder, 2017) that would suggest contracted out workers face wage penalties. However, it is important to remember that AWAs can be used at both the top and bottom of the distribution, and it may be that firms use contracted out workers for both high and low-skilled work.

It also appears that, aside from On Call Workers, all other AWA types are likely to be considered Full Time employees and work, on average, more than 35 hours per week. This would suggest that AWAs are distinct from what we would consider "part time" work, but instead represent a different relationship to the firm.[45]

All job types appear more likely to switch jobs after their interview, suggesting that there is likely more turnover between AWAs and other contracts. Consistent with the findings in the wider literature, Independent Contractors are older on average than regular employees, suggesting that workers may simply be more likely to become independent contractors as they age.

However, in this section, I do not control for ability type, industry, and other factors. If Contract Company workers are more likely to be in certain high-paying industries or occupations, we will observe higher average wages and benefits rates, even if the contract form causes lower pay. Therefore, in the next section I will examine both what might cause a worker to enter an AWA, as well as what effect contract type might have on outcomes after we condition for covariates.

7.2 Reduced Form Evidence

7.2.1 Demographic Characteristics

To see what may cause a worker to enter AWAs, I first provide initial reduced form evidence to show the relationship between demographic factors and the probability of entering various types of alternative work. A worker's contract will affect economic characteristics, such as hours worked and family income, so these regressions only include demographic predictors. Table 2 show these results broken out by contract form.

Black workers are substantially more likely to be hired by temporary help agencies and contract companies, and substantially less likely to be working as independent contractors. This result is in line with some of the literature on employer prejudice, specifically Bertrand and Mullainathan (2004), who found that workers with "black sounding" names were less likely to get callbacks. The pattern is largely true for hispanic

[45] Controlling for covariates in Table 3, I find that all but On Call AWAs work <1 hour per week less than standard contracts, again suggesting they are working full-time. On-Call workers work 4.7 hours per week less than standard contracts.

employees, however they are less likely to be employed by a contract companies and more likely to be on call.

Interestingly, across the board it appears that older workers are less likely to be in most AWAs, but *more* likely to be independent contractors. This may help explain the age gradient found by Katz and Krueger (2016). In my data from 1995-2005, older workers appear to be the least likely to be in AWAs, and the shift from 2005 to 2015 they found may have primarily been a demographic shift of older workers (non-AWA) workers from this sample retiring, and younger (AWA) workers becoming older.[46] Non-citizens are also more likely to be in AWAs across all job types.

Finally, more education is associated with increased likelihood of being an independent contractor, and less likely of being hired by a temp agency or on call. This could suggests that the various forms of AWAs bifurcate workers by type, with high-types becoming independent contractors, and low types working on call or for Temp-Help agencies. This is in line with the predictions of the model in Lemieux et al. (2009), where performance pay contracts can be used extensively at both the top and the bottom of the wage and ability distributions.

The job-characteristics framework of MacLeod and Parent (1999) also may explain some of these effects. While there is an overall shift towards contracts that are responsive in effort, the exact form of the contract will depend on job characteristics. Independent Contractors are potentially used for contracts with less deterministic or observable outcomes, and non-contractible performance (i.e. the firm cannot observe effort easily). Temporary-help contracts could be used for routine jobs with easily observable tasks.

However, the higher rates of pay for independent contractors may simply be a wage premium to help those workers pay for benefits. In the next section, I show that most of the variation in pay and benefits is driven by occupation and industry distribution of contracts.

7.2.2 Are Alternative Work Arrangements Worse?

Alternative work and contract type should have substantial effects on economic outcomes. One important welfare aspect that generally isn't considered by researchers is variability in number of hours worked. Mas and Pallais (2016), for example, find that workers broadly prefer fixed schedules, suggesting that the majority of workers are risk-averse when it comes to working hours.

While it appears that contract company workers are paid more, this may not be true once we control for covariates. AWAs workers may also have more jobs and variability in hours than regular employees. I test

[46] It is not clear whether this age gradient holds given the updated information from the CWS.

the effect of contract form on a variety of economic outcomes by running the following regressions:

$$Outcome_i = \beta' ContractType + \beta_2' X_i + \epsilon_i$$

Where $Outcome_i$ is a dependent economic variable including: whether a worker works a variable of number of hours per week, whether a worker;s family makes $60,000 per year, whether a worker holds multiple jobs, and the usual number of hours per week. $ContractType_i$ is a vector which equals 1 depending on the type of contract of the worker. X_i is a vector of worker characteristics, including occupation, industry, education fixed effects, gender, age, and location. ϵ_i is an error term. The results are shown in Table 3.

When examining some of the effects of contract type, and after controlling for industry and occupation specific effects, we can see that there are some surprising results. Temp Agency, Independent Contractors and On Call workers are more likely to work variable hours, however this may be more due to the type of work that they perform.

What is most surprising is that these results suggest that when controlling for industry and occupation, all AWAs except contracted out workers appear to be paid less than "Regular" contracts. This provides credence to AWA contracts being worse. Additionally, Temp Agency workers and on call workers are less likely to be high income.[47]

Additionally, I find that these types of workers, across all contract types, are less likely to have employer-provided health insurance, Contract workers are 6% less likely to have health insurance, while Independent Contractors and Temp-Help workers are *15%* less likely. This is in line with the belief that firms use AWAs to reduce fixed costs of employment, primarily through benefits. Additionally, all but contracted out workers are more likely to have multiple jobs.

The results for contractors is also in line with the results found by Dorn et al. (2018), who found relatively minor wage penalties for US contract workers. They speculate that healthcare may be the reason for firms contracting out, supported by these results. However, these workers do appear to have slightly less variable hours.

These results also show that AWAs do appear to be on balance "worse". While certain contracts are paid more, when controlling for industry or work different hours, when controlling for industry occupation these differences disappear. After controlling for covariates, AWA workers are uniformly paid less and less likely to gain insurance. However, these results are not causal. As discussed in Section 4, AWA workers may enter

[47] Because Independent Contractors are paid via 1099 forms, there may be bias if they report they are not paid wage income. Running the same regression using total income leads to very similar results.

this form of employment because they are of lower type. While I did control for education, there may be unobserved (to the econometrician) error due to differences in ability. These results do provide evidence for the fact that AWAs result in workers being worse off than standard employment, but they may be better off if they would be otherwise unemployed.

In the next section, I turn to causal estimates of the effect of competition shocks on AWAs.

7.3 Effect of Competition Shocks on Alternative Work

While the results in Section 7.2 are interesting, there is a clear issue of endogeneity in determining the effects of contract form, where the contract worker is employed under may be correlated with ability or other factors that are unobserved by the researchers. Differences in ability may be driving workers' contract form after shocks. Additionally, the above results mainly address the question of outcomes, not determinants of AWAs.

In this section I seek to answer the following question: Do competition shocks cause increases in AWAs? Fixed costs around hiring suggest that when firms face the pressure to cut costs, they may turn to AWAs for a portion of their workforce to avoid those fixed costs. Therefore, we expect to see an increase in AWA rates with higher competition shocks.

To examine the effect of this prediction, I turn to the methodology outlined in Section 6.1.1. As a preview of my results: I find that competition shocks increase AWA rates, with an increase in trade of \$1000/worker associated with a 3.2% increase in AWA rates, an increase driven primarily by higher shares of the working age population in temporary help agencies and on call work, though we see increases in other contract types as well.

7.3.1 State-Level

I first test the prediction that AWA rates will increase in response to competition shocks. The first regression specification is the same as Equation 4, where the change in weighted trade between China and the U.S. is instrumented by the weighted change in trade between China and other high-income countries. The results for the first set of regressions are presented in Table 4, showing the effect of trade shocks on the percentage of the working age population employed in alternative work arrangements.[48]

As the results show, increases in competition shocks greatly increased the rates of AWAs. Moreover, because AWA rate is measured as a percentage of the working age *population*, this result is not a mechanical

[48] As a robustness check, I also see the effects controlling for the change in share of workers employed in manufacturing. While there is a modest reduction in the magnitude of point estimates, the coefficients are still positive and significant.

result driven by decreases in manufacturing labor, suggesting firms really did increase AWA usage in response to the competition shock. This result is also robust to a number of different weighting schemes. An additional $1,000/worker in trade shock increases rates of AWA usage by approximately 3.2%. The average state-level trade shock between 2001 and 2005 was approximately $1,260, leading to a predicted increase in AWA rates of approximately 4% over that period.

This analysis provides the first evidence that trade shocks are associated with higher AWA rates. The findings in Autor et al. (2013) suggested that in response to higher levels of trade from China, labor-intensive manufacturing firms were forced to cut labor costs, and did so by laying workers off. These results suggest that they *also* increased the rates at which they hired workers in alternative contract forms, and the association suggests it was primarily to reduce labor costs. Dube and Kaplan (2010) find that high pre-existing labor costs are associated with contracting out, where firms with high worker rents were the most likely to use contracting companies. This result is striking, but, as discussed above, not all contract forms are created equally. Therefore, I will now investigate which contract forms had the largest increases in response to competition shocks. Dey et al. (2012) suggest that the manufacturing firms appeared to use more Temporary Help workers over this time period, so we may expect a larger increase in that workforce in response to trade shocks. These results are shown in Table 5.

As we can see, it appears that an additional $1000/worker of trade shocks increased the percentage of the population employed in Contract Company work by .2%, Temp Agency work by .4%, On Call work by .5%, and Independent Contracting by more than 2%. Given the low pre-existing rates of AWA contracts, at around 10% of the workforce, these are relatively large predicted increases.[49] For example, the average increase in trade shocks from 2001 to 2005 was $1260/worker, meaning an additional .75% of the working age population was in Temp Agency work, compared with a rate of .5% of the population in 2001, meaning they would have more than *doubled* due to the trade shocks. The absolute increase in Temp Agency workers may be even higher due to underreporting, something that is worth exploring in later research.

The increases seem to be most concentrated among Independent Contractors, which is surprising given the expectation that Independent Contractors are more skilled. However, as I showed in Section 7.2, when controlling for industry and occupation, Independent Contractors are paid less than salaried employees. These effects are at the state level, so it may also be the case that workers are shifting towards being

[49]The number of observations in certain state-year-contracts is somewhat low, meaning there is noise in the estimates of the change in share of AWAs. However, the strongest results come from Independent Contractors which is the largest contract type and would have the most accurate estimates. I do not expect that the low levels of observations would impact the significance of my results in one direction or another, but may result in imprecise measures of the effect of trade shocks on share of certain contracts.

independent contractors in non-manufacturing industries. For example, if an electrician at a manufacturing firm became an independent contracting electrician after the shock, we would observe lower manufacturing employment and an increase in Independent Contracting, even if that worker is performing the same job, potentially for the same firm.

These findings show that in response to trade shocks, all forms of AWAs became more prevalent, but the increase primarily occurred Independent Contracting. Because of the pressures to reduce labor costs, firms used AWAs in order to reduce those labor costs further. However, this result does not seem to be consistent with the 2017 CWS. Given that trade has increased since 2005, why have we not seen a commensurate increase in AWAs over the same time period? As discussed above, as firms adapt to the trade shock over the medium and long-term, and as the economy improves, they may prefer to return to the pre-shock level of AWA employment. If there is a reduction in productivity and worker quality when hiring a worker under an AWA, as discussed in Section 4, it may be worthwhile for firms to pay for a standard employee once they can afford the higher fixed costs. Unfortunately, because the CWS was not run since 2005, we cannot see if there was a spike of AWAs during the other shocks, particularly the Great Recession.

Finally, it may be the case that newer legal regulations are partially responsible for the lack of increase we see. If health insurance costs are the primary fixed cost, implementation of the Affordable Care Act may have reduced the difference in costs between a Temp Help worker and a regular employee, since the staffing agency now has to provide health insurance. If this was the case, the firm may decide to simply hire an employee themselves rather than using a Temp, because the labor costs are no longer worth the difference in monitoring ability, for example. In the case of Independent Contractors, the cost of the private market and the individual mandate may have pushed previous independent contractors to take salaried positions.

In this section, I have shown that at the state-level, higher trade shocks appear to causally increase the usage of AWAs, and that those increases appear to primarily occur in Independent Contracting. In the next section, I will examine the effect that higher AWA usage has on inequality rates. Mechanically we expect that they would increase, but because AWAs are such a small part of the labor force we do not expect a large effect.

7.3.2 Effect of Higher AWAs on Inequality

In this section, I test the effect that AWAs have on state-level inequality measures. I report the effect of the AWA share of the working age population in AWAs on the Theil and Gini indices, as well as the share of income going to the Top 5 and Top 1% of the population. Because using trade shocks as an instrument for

AWA share may not be appropriate, I provide both OLS and IV estimates.

We expect that AWAs will increase inequality rates, since the findings of Goldschmidt and Schmieder (2017) suggest that Contracting Out are responsible for a portion of the increase in German wage inequality. If specific contract forms are used at both ends of the distribution, it would also mechanically increase wage inequality, due to more contracts based on effort and worker type, rather than job-specific rents. (Lemieux et al., 2009; Dube and Kaplan, 2010)However, if AWAs in the U.S. are associated with lower levels of *benefits* rather than income, we may not see an effect of AWAs on inequality, even though there is an effective reduction in income at the bottom end of the distribution due to higher health expenditures.

I show the results on Inequality in Tables 6 and 7.

Regardless of using OLS or IV, AWAs are associated with higher rates of inequality, and for every 1% increase in AWA rate, a .24% of higher share of income going to the Top 1%. If we use the IV estimates, that is a 3% increase in income share. The coefficients on the Theil and Gini indices are also positive, and in the case of the Theil are not significant using OLS. Nevertheless, it appears that AWAs are associated with at least slightly higher rates of inequality.

This result is consistent with expectations, though the magnitude using IV estimates is fairly large. Given the relatively low percentage of AWAs in the workforce, their higher usage would be expected to increase inequality, but it is unlikely their usage would change the share of Top 1% income by 3%. Nevertheless, this finding does suggest that income inequality is associated with contracting form.

However, it may be the case that AWAs reduce inequality depending on the counterfactual. If the counterfactual for AWA workers is unemployment, AWAs will decrease inequality by keeping low-wage workers employed. As discussed in Lemieux et al. (2009), flexible pay arrangements can decrease inequality if the other option is unemployment under a fixed wage contract. However, if the counterfactual is standard employment, AWAs would increase inequality. As discussed above, if the contract form is a mechanism to achieve lower labor costs, it would be the reduction in wages and benefits aimed at the lower end of the distribution that increases inequality, not the contract form itself.

In the past two sections, I have examined the effect of competition shocks on AWA rates, and found that in response to competition, firms appear to use more AWAs. I have also found that AWAs appear to be associated with a minor increase in inequality. In the next section, I will examine the effect of competition shocks at the micro level.

7.3.3 Micro Level

In examining the effect of shocks at the micro level, I utilize the reported client industry for Temp Agency workers and Contract workers, to better identify whether trade shocks increase AWAs at the micro level. It is worth keeping in mind that, because these estimates were constructed at the metropolitan area-industry level, they do not incorporate workers who live in rural areas or non-manufacturing. This means that, if I find no increase in AWAs using the micro data, it may be that said increase is concentrated in non-metropolitan or non-manufacturing industries. This might indicate that rural manufacturing firms are potentially more able to use AWAs. Workers have a preference for more stable contracts (Mas and Pallais, 2016), so in metropolitan areas with more employers competing for workers, firms may not be able to use AWAs as easily. It may also indiciate substantial changing of worker classification into non-AWA industries.

In Table 8, I show the effect of micro-level trade shocks on the *probability* of a remaining manufacturing worker entering an AWA.

As the results show, it appears that there was no increase in overall AWA rates at the micro-level, suggesting that overall increases may be driven by rural areas or non-manufacturing firms. Additionally, this coefficient is robust to a number of different controls. This suggests that while there was an overall increase in AWA rates, it may primarily be driven by non-manufacturing or rural workers changing contract type.

However, there may still have been an increase in *specific types* of contracts in the manufacturing industries, which is masked by an overall non-change in AWAs. To that end, I investigate whether a remaining manufacturing worker has a higher chance of being in one of the four contract types I described.

I provide the same results broken out by contract type in Table 9.

Here, we find that when broken out by contract type, there has been a 4% decrease in the probability of a manufacturing worker being employed as an independent contractor, but a 2.1% increase in the probability of a manufacturing worker being employed by a Temporary Help firm. The results for Temp Agency workers is broadly consistent with Dey et al. (2012), however the result for Independent Contractors is surprising given my results at the state-level. However, as discussed above, it is possible that worker industry could change due to becoming an independent contractor, explaining the reduction. Additionally, if the types of work for which manufacturing firms use independent contractors are more expensive, then we migh see a decrease in independent contractors rates within manufacturing.

While these results show no change for Contract or On Call workers, it is worth noting that the offsetting contracting could be occuring: if manufacturing firms reduce their high-wage contracted out workers, but increase their low-wage contracted out workers, these effects would offset. Again, this could result in changes

to worker's stated industry. If a manufacturing firm decides to contract out their janitorial staff, those workers will now be coded as non-manufacturing contracted out workers, and would not appear in this analysis, even though overall contracting out has increased.

I also estimate the effect of trade shocks on wages, hours, variability, and insurance provision in working hours for non-AWA manufacturing workers. I show these results in Table 10.

As we can see, for non-AWA workers, trade shocks increase working hours by about two hours per week, increase the probability of family income being above $60,000 per year, have no effect on variability of hours, and increase the probability of employer-provided insurance by 11%. However, the effect of income is only significant at the 10% level. All of these results are consistent with trade shocks increasing the average type of the remaining "regular" employee, while simultaneously firms employ more workers under AWAs. Additionally, when running the same regressions broken out by contract, I find that independent contractors have less variable hours in response to trade shocks. This is in line with the results above, where firms may be laying off independent contractors because they are too expensive.

In this section, I have shown that, when using micro-level evidence, it appears that manufacturing workers exposed to a trade shock are less likely to be an independent contractors and more likely to be temporary help workers. The result for independent contractors (and lack of result for other contract forms) is surprising, given the findings in Section 7.3.1, where we found an increase in all contract forms. This difference could be driven by AWA rates increasing in non-manufacturing while decreasing in manufacturing. Both are possibilities, Autor et al. (2014) suggest that high-wage workers exposed to trade shocks transfer to non-manufacturing industries more easily, they may become independent contractors after the trade shocks.

8 Future Research

Because this research is one of the first examinations of the effect of competition shocks on contract forms, there are a number of avenues for future research. Most importantly, it shows the need to treat different types of contracts separately when examining the effect of shocks, but also accounting for industry and occupation effects. Because AWAs are used in a number of different contexts across a number of different industries, a large amount of variation in AWA wages and benefits appear to be due to differences in the work type of the average AWA employee, rather than contract-specific effects.

One fruitful area of research would be to investigate the role of recent regulation as well as the recession in determining AWA rates. While I have explored the context of a trade shock, they are just one determinant.

Theoretically any increase in competition, changing regulation that increases wage premiums for certain contracts, or decrease in worker outside option could result in more AWAs. Another fruitful area of research would be to further investigate the role of investments in automation. Firms have made recent investments in automation (Acemoglu and Restrepo, 2017), which may have an effect on the characteristics of jobs and could encourage higher AWA usage as an optimal contract. (MacLeod and Parent, 1999)

Additionally, there is a substantial need for more data on contract form, and that one of the focuses of new research should be identifying contract shares in the "missing years" of the CPS' Contingent Worker Supplement.[50] The lack of easily available data has been noted before (Bernhardt, 2014), and prompted new collection efforts (Katz and Krueger, 2016). Researchers have also begun examining administrative records for evidence of Independent Contractors, using the 1099-MISC form. Nevertheless, administrative records may also be unable to help determine these contracts, especially if there is substantial firm-level variation in usage of 1099-MISC. This data also would not pick up other AWAs. Indeed, determining who AWA workers ultimately work *for* is difficult to obtain. There is substantial underreporting of Temp Agency workers in surveys, and the CWS focuses on single-employer contract workers. Who Independent Contractors work for, especially in cases of misclassification is also important to understand.

Even with detailed occupation and industry codes, such as those provided by the CPS, there may not be enough information to determine contract type given how variable an occupation can be across firms. This is likely due to variation across firms in technological investment and organization, which can change the type of tasks a specific worker performs. Understanding when firms are using these types of contracts is an important research area, especially given regulators recent focus on joint-employer relationships and misclassification. Additionally, a worker may be observed as changing industries when in reality they have been contracted out. Researchers have focused on these workers in specific industries (Goldschmidt and Schmieder, 2017; Dube and Kaplan, 2010), but extending these analyses to other industries which are not as easily classified is important.

Finally, a better understanding of the counterfactuals with AWAs is necessary. AWAs may reduce inefficiency and inequality and increase welfare if they are used to add an additional job, as described in my model. However, if they are used to replace standard employment contracts, as in cases of misclassification, they would be welfare and productivity reducing. There may also be long-term effects of AWAs on employment

[50] New techniques such as Ensemble Methods (Hastie et al. (2009); Zhou (2012a)) may be helpful in predicting contract type for the "missing years" of 2006 - 2016. However, the relatively small number of observations and low proportion of AWA workers in the CPS lead to a lack of useful predictions when using these techniques on the existing CPS Contingent Worker Supplement. As more and better data on contract form becomes available, we may be able to create a better predictive model that can fill these gaps.

that could impact this welfare calculation.

9 Conclusion

The determination of who is an employee can have substantial effects on workers, including determining who receives benefits and who is protected in instances of collective action. AWAs generally preclude workers form having access to a number of protections. Nevertheless, researchers have had difficulty in determining what causes firms to use these contracts. While there is an understanding that firms may be using AWAs to reduce labor costs (Muhl, 2002; Goldschmidt and Schmieder, 2017), recent data suggests that, contrary to expectations, there has been no substantial increase in AWAs.

In this paper, I suggest that legal rules can make AWAs less productive and may attract lower-type worker. This reduces firms' willingness to use these contracts generally, but firms may use AWAs as a short-term response to a shock to reduce fixed labor costs. I provide first evidence of one of the determinants of AWA usage, competition shocks. I show that AWAs increased across a number of contract forms in response to higher trade competition from China, primarily among independent contractors. In this instance, AWAs may still be welfare and efficiency increasing, as they allow firms to employ an additional individual. However, as the economy improves or firms adapt, they may prefer to have a non-AWA employee, especially if the AWA worker is of lower type or the firm cannot exercise as much control over the worker as they would prefer.

My results suggest that the lack of a trend in AWAs can be explained by their relatively narrow use as employment primarily after a shock. The 2017 Contingent Worker Supplement showed that there was a marginal decrease in all AWA types since 2005, suggesting firms adapted to the trade shock and potentially may have moved away from AWAs as the economy improved.

I also show that trade shocks increased the likelihood of manufacturing workers becoming temporary help workers, but decreased their likelihood of being independent contractors, suggestive evidence that firms sought to reduce labor costs by switching to less expensive contracts. The balance of results between my findings at the state-level and micro-level also suggest that the increases in contracting out and independent contracting primarily occurred in non-manufacturing industries or in rural areas. If manufacturing firms are using more contracting out of low-type workers, this may also shift workers to non-manufacturing industries in survey responses.

Finally, I find that there are positive associations between AWA rates and inequality, however this may be driven by effects of the trade shock reducing wages, and the counterfactual is difficult to estimate. If

workers would otherwise have been unemployed, AWAs may have kept inequality levels lower than if AWAs were not allowed. The counterfactual is also important for determining welfare effects of AWAs. If AWAs replace standard employment, they are welfare reducing. If they replace unemployment, workers are better off.

While AWAs do not appear to be increasing as a share of employment (per the 2017 Contingent Worker Supplement), it is important for researchers to better understand some of the causes of these contract forms. These contracts are not primarily used in-lieu of part-time work, and while some of the differences in wages and benefits may be due to type differences, better understanding of contract form is important for understanding the labor market, especially if these contracts are primarily due to shocks or recessions.

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A Legal Appendix

In this section, I provide text of some of the relevant regulations and legal decisions discussed in Section 3.

A.1 HIPAA

"SEC. 702. PROHIBITING DISCRIMINATION AGAINST INDIVIDUAL PARTICIPANTS AND BENEFICIARIES BASED ON HEALTH STATUS.
"(a) IN ELIGIBILITY TO ENROLL.—
"(1) IN GENERAL.—Subject to paragraph (2), a group health plan, and a health insurance issuer offering group health insurance coverage in connection with a group health plan, may not establish rules for eligibility (including continued eligibility) of any individual to enroll under the terms of the plan based on any of the following health status-related factors in relation to the individual or a dependent of the individual:
"(A) Health status.
"(B) Medical condition (including both physical and mental illnesses).
"(C) Claims experience.
"(D) Receipt of health care.
"(E) Medical history.
"(F) Genetic information.
"(G) Evidence of insurability (including conditions arising out of acts of domestic violence).
"(H) Disability.

"(2) NO APPLICATION TO BENEFITS OR EXCLUSIONS.—To the extent consistent with section 701, paragraph (1) shall not be construed—

"(A) to require a group health plan, or group health insurance coverage, to provide particular benefits other than those provided under the terms of such plan or coverage, or

"(B) to prevent such a plan or coverage from establishing limitations or restrictions on the amount, level, extent, or nature of the benefits or coverage for similarly situated individuals enrolled in the plan or coverage.

"(3) CONSTRUCTION.—For purposes of paragraph (1), rules for eligibility to enroll under a plan include rules defining any applicable waiting periods for such enrollment.

"(b) IN PREMIUM CONTRIBUTIONS.— "(1) IN GENERAL.—A group health plan, and a health insurance issuer offering health insurance coverage in connection with a group health plan, may not require any individual (as a condition of enrollment or continued enrollment under the plan) to pay a premium or contribution which is greater than such premium or contribution for a similarly situated individual enrolled in the plan on the basis of any health status-related factor in relation to the individual or to an individual enrolled under the plan as a dependent of the individual.

"(2) CONSTRUCTION.—Nothing in paragraph (1) shall be construed—

"(A) to restrict the amount that an employer may be charged for coverage under a group health plan; or

"(B) to prevent a group health plan, and a health insurance issuer offering group health insurance coverage, from establishing premium discounts or rebates or modifying otherwise applicable copayments or deductibles in return for adherence to programs of health promotion and disease prevention.

A.2 ERISA

SEC. 702. [1182] PROHIBITING DISCRIMINATION AGAINST INDIVIDUAL PARTICIPANTS AND BENEFICIARIES BASED ON HEALTH STATUS.

(a) IN ELIGIBILITY TO ENROLL.— (1) IN GENERAL.—Subject to paragraph (2), a group health plan, and a health insurance issuer offering group health insurance coverage in connection with a group health plan, may not establish rules for eligibility (including continued eligibility)

of any individual to enroll under the terms of the plan based on any of the following health status-related factors in relation to the individual or a dependent of the individual:
(A) Health status.
(B) Medical condition (including both physical and mental illnesses).
(C) Claims experience.
(D) Receipt of health care.
(E) Medical history.
(F) Genetic information.
(G) Evidence of insurability (including conditions arising out of acts of domestic violence).
(H) Disability.
(2) NO APPLICATION TO BENEFITS OR EXCLUSIONS.—To the extent consistent with section 701, paragraph (1) shall not be construed—
(A) to require a group health plan, or group health insurance coverage, to provide particular benefits other than those provided under the terms of such plan or coverage, or
(B) to prevent such a plan or coverage from establishing limitations or restrictions on the amount, level, extent, or nature of the benefits or coverage for similarly situated individuals enrolled in the plan or coverage.
(3) CONSTRUCTION.—For purposes of paragraph (1), rules for eligibility to enroll under a plan include rules defining any applicable waiting periods for such enrollment.
(b) IN PREMIUM CONTRIBUTIONS.—
(1) IN GENERAL.—A group health plan, and a health insurance issuer offering health insurance coverage in connection with a group health plan, may not require any individual (as a condition of enrollment or continued enrollment under the plan) to pay a premium or contribution which is greater than such premium or contribution for a similarly situated individual enrolled in the plan on the basis of any health statusrelated factor in relation to the individual or to an individual enrolled under the plan as a dependent of the individual.

A.3 IRS Control Rules

5.1.24.1.1 (03-02-2018)

Background

This IRM section provides a summary of the different types of third-party payer arrangements and procedural guidance for Collection employees investigating employment tax delinquencies involving employers and third-party payers.

An employer may choose to enter into an agreement with a third party in which the third party performs some or all of the employer's federal employment tax withholding, reporting and payment obligations. Collection issues arise when the third party fails to file returns, make deposits, or pay on behalf of the employer.

The liability of the employer for employment taxes may shift depending on the type of third-party arrangement.

Liability is always determined by the provisions of the Internal Revenue Code (IRC or Code) and cannot be altered by a private agreement or contract between an employer (see IRM 5.1.24.3) and a third party.

5.1.24.3.2.1 (08-15-2012)

Control of the Payment of Wages

A third party is the section 3401(d)(1) employer only if it has exclusive control over the payment of wages. Treasury Regulation 31.3401(d)-1(f) provides that the term "employer" means the person having legal control of the payment of the wages. If it shares control with the common law employer, then the third party is not a section 3401(d)(1) employer.

Whether or not a third party is in control of the payment of wages depends upon the facts and circumstances. Generally, the IRS considers a third party to be in control of the payment of wages if the payment is not contingent upon, or proximately related to, the third party having first received funds from the employer. Conversely, if the payment of wages is contingent on, or proximately related to, the common law employer's transfer of funds to the third party, the Service considers the common law employer to be in control of the payment of wages. Thus, the common law employer remains obligated to withhold, report, and pay employment taxes.

The determination of whether a third party is a section 3401(d)(1) employer is based on the facts and circumstances. The third-party payer could be a section 3401(d)(1) employer for some payments and not for others.

A.4 IRS Fact Sheet on Misclassification

FS-2017-09, July 20, 2017

The Internal Revenue Service reminds small businesses of the importance of understanding and correctly

applying the rules for classifying a worker as an employee or an independent contractor. For federal employment tax purposes, a business must examine the relationship between it and the worker. The IRS Small Business and Self-Employed Tax Center on the IRS website offers helpful resources.

Worker classification is important because it determines if an employer must withhold income taxes and pay Social Security, Medicare taxes and unemployment tax on wages paid to an employee. Businesses normally do not have to withhold or pay any taxes on payments to independent contractors. The earnings of a person working as an independent contractor are subject to self-employment tax.

The general rule is that an individual is an independent contractor if the payer has the right to control or direct only the result of the work, not what will be done and how it will be done. Small businesses should consider all evidence of the degree of control and independence in the employer/worker relationship. Whether a worker is an independent contractor or employee depends on the facts in each situation.

Help with Deciding

To better determine how to properly classify a worker, consider these three categories – Behavioral Control, Financial Control and Relationship of the Parties.

Behavioral Control: A worker is an employee when the business has the right to direct and control the work performed by the worker, even if that right is not exercised. Behavioral control categories are:

- Type of instructions given, such as when and where to work, what tools to use or where to purchase supplies and services. Receiving the types of instructions in these examples may indicate a worker is an employee.
- Degree of instruction, more detailed instructions may indicate that the worker is an employee. Less detailed instructions reflects less control, indicating that the worker is more likely an independent contractor.
- Evaluation systems to measure the details of how the work is done points to an employee. Evaluation systems measuring just the end result point to either an independent contractor or an employee.
- Training a worker on how to do the job -- or periodic or on-going training about procedures and methods -- is strong evidence that the worker is an employee. Independent contractors ordinarily use their own methods.

Financial Control: Does the business have a right to direct or control the financial and business aspects of the worker's job? Consider:

- Significant investment in the equipment the worker uses in working for someone else.
- Unreimbursed expenses, independent contractors are more likely to incur unreimbursed expenses than employees.
- Opportunity for profit or loss is often an indicator of an independent contractor.
- Services available to the market. Independent contractors are generally free to seek out business opportunities.
- Method of payment. An employee is generally guaranteed a regular wage amount for an hourly, weekly, or other period of time even when supplemented by a commission. However, independent contractors are most often paid for the job by a flat fee.

Relationship: The type of relationship depends upon how the worker and business perceive their interaction with one another. This includes:

- Written contracts which describe the relationship the parties intend to create. Although a contract stating the worker is an employee or an independent contractor is not sufficient to determine the worker's status.
- Benefits. Businesses providing employee-type benefits, such as insurance, a pension plan, vacation pay or sick pay have employees. Businesses generally do not grant these benefits to independent contractors.
- The permanency of the relationship is important. An expectation that the relationship will continue indefinitely, rather than for a specific project or period, is generally seen as evidence that the intent was to create an employer-employee relationship.
- Services provided which are a key activity of the business. The extent to which services performed by the worker are seen as a key aspect of the regular business of the company.

A.5 NLRB Decision - Laerco Transportation (1984)

"The joint employer concept recognizes that two
or more business entities are in fact separate but
that they share or codetermine those matters governing
the essential terms and conditions of employment.

l ° Whether an employer possesses sufficient
indicia of control over petitioned-for employees
employed by another employer is essentially a
factual issue. To establish joint employer status
there must be a showing that the employer meaningfully
affects matters relating to the employment
relationship such as hiring, firing, discipline, supervision,
and direction. In examining the relationship
between Laerco and CTL, we find that Laerco
does not possess sufficient indicia of control over
CTL employees to support a joint employer finding.
It is undisputed that the major elements of the
petitioned-for employees' terms and conditions of
employment are determined by CTL in context of
its collective-bargaining relationship with the Intervenor.
In fact, the very acquisition and retention of
their employment is controlled by CTL. CTL provides
these employees to Laerco who, for the most
part, supplies them to its clients. Thus, in the instant
situation Laerco, itself, is removed from some
of the daily worksites of the employees."

A.6 NLRB Decision - Browning-Ferris (2015)

"Today, we restate the Board's joint-employer standard
to reaffirm the standard articulated by the Third Circuit
in Browning-Ferris decision. Under this standard, the
Board may find that two or more statutory employers are
joint employers of the same statutory employees if they
"share or codetermine those matters governing the essential
terms and conditions of employment."
In determining

whether a putative joint employer meets this standard, the initial inquiry is whether there is a common-law employment relationship with the employees in question. If this common-law employment relationship exists, the inquiry then turns to whether the putative joint employer possesses sufficient control over employees' essential terms and conditions of employment to permit meaningful collective bargaining."

Table 1: Descriptive Statistics by Contract Type

	Contract Type				
	Regular	Temp Agency	Contract Co.	Ind. Contractor	On Call
No. Children	0.90	0.75	0.77	0.96	0.89
	(1.14)	(1.13)	(1.09)	(1.20)	(1.21)
Age	39.61	36.16	38.52	45.40	39.08
	(12.83)	(12.90)	(12.17)	(12.56)	(14.87)
Female	0.49	0.56	0.30	0.34	0.49
	(0.50)	(0.50)	(0.46)	(0.47)	(0.50)
Hispanic	0.08	0.12	0.07	0.05	0.11
	(0.28)	(0.33)	(0.26)	(0.22)	(0.31)
Years Education	13.60	13.11	13.64	14.03	12.98
	(4.26)	(3.94)	(4.62)	(4.37)	(4.31)
Has Multiple Jobs	0.07	0.07	0.06	0.09	0.09
	(0.25)	(0.26)	(0.24)	(0.29)	(0.29)
Usual Hrs Worked	39.25	37.32	40.33	40.58	33.43
	(10.84)	(9.28)	(10.51)	(14.78)	(13.78)
Variable Hours	0.07	0.10	0.04	0.21	0.28
	(0.25)	(0.30)	(0.21)	(0.41)	(0.45)
Full Time Employee	0.82	0.75	0.85	0.73	0.47
	(0.39)	(0.43)	(0.36)	(0.44)	(0.50)
Wage Income[1]	31,859.19	17,108.61	38,484.85	18,936.19	19,288.19
	(49916.69)	(17843.82)	(39646.32)	(44625.41)	(25620.68)
Employer Insurance[1]	0.58	0.33	0.57	0.37	0.44
	(0.49)	(0.47)	(0.50)	(0.48)	(0.50)
In Pension Plan[1]	0.37	0.09	0.33	0.08	0.18
	(0.48)	(0.28)	(0.47)	(0.27)	(0.39)
Job Switch[2]	0.04	0.14	0.08	0.06	0.074
	(0.21)	(0.34)	(0.27)	(0.23)	(0.26)
Observations[3]	219,040	2,044	1,205	16,688	4,220

Standard Deviation in Parenthesis.

1: Insurance, Pension Plan, Wage Income Information are calculated using the March Supplement and only calculated for workers who reported working for the same employer in each interview after February, and were in their 5th month of interview or later.

2: Job Switch is determined by whether a worker reported working for a different employer *after* their interview in February.

3: Observations list the number of observations by contracts with observed Hours Worked listed as in the labor force accross all CWS Supplements. Due to variables coming from the outgoing rotation group Wage Income, Employer Insurance, In Pension Plan, and Job switch have fewer observations.

Table 2: Demographic Predictors of Contract Type

	Dependent variable:			
	Contract Co.	Temp Agency	On Call	Independent Contractor
	(1)	(2)	(3)	(4)
Black	0.189**	0.861***	−0.037	−0.698***
	(0.095)	(0.059)	(0.058)	(0.039)
Am. Indian/Eskimo	0.278	0.108	0.521***	−0.258***
	(0.253)	(0.226)	(0.115)	(0.091)
Asian	0.349**	0.088	−0.217**	−0.354***
	(0.143)	(0.127)	(0.101)	(0.053)
Other Race	0.219	0.469*	0.240	−0.056
	(0.456)	(0.275)	(0.230)	(0.176)
Yrs. Education	−0.009	−0.021***	−0.025***	0.013***
	(0.006)	(0.005)	(0.003)	(0.002)
Hispanic	−0.326***	0.330***	0.139**	−0.476***
	(0.125)	(0.082)	(0.062)	(0.041)
Family Size	−0.211***	−0.090***	0.093***	−0.110***
	(0.032)	(0.021)	(0.014)	(0.011)
Female	−0.795***	0.335***	0.083***	−0.585***
	(0.061)	(0.045)	(0.031)	(0.017)
Metropolitan Areas	0.314***	0.483***	−0.364***	−0.019
	(0.094)	(0.084)	(0.041)	(0.023)
Born Abroad	0.174	0.234	−0.068	0.232***
	(0.271)	(0.212)	(0.174)	(0.084)
Naturalized Citizen	−0.218	0.025	−0.380***	0.166***
	(0.174)	(0.124)	(0.105)	(0.044)
Not a Citizen	0.443***	0.354***	0.320***	0.141***
	(0.117)	(0.089)	(0.068)	(0.043)
Age	−0.011***	−0.022***	−0.002	0.032***
	(0.002)	(0.002)	(0.001)	(0.001)
No. Children	0.124***	−0.055*	−0.108***	0.193***
	(0.042)	(0.029)	(0.018)	(0.013)
Constant	−4.178***	−4.124***	−3.571***	−3.689***
	(0.172)	(0.142)	(0.090)	(0.053)
Observations	243,197	243,197	243,197	243,197
Akaike Inf. Crit.	16,018.350	23,030.840	42,288.490	116,438.600

Note: *p<0.1; **p<0.05; ***p<0.01

Table 3: Economic Effects of Contract Type

	Dependent variable:				
	Variable Hours	Wage Income	High Income	Emp. Insurance	Multiple Jobs
	(1)	(2)	(3)	(4)	(5)
Temp Agency	0.027^{***}	$-10,004.180^{***}$	-0.079^{***}	-0.149^{***}	0.017^{**}
	(0.007)	(2,082.518)	(0.011)	(0.021)	(0.007)
Contract Co.	-0.019^{**}	1,428.923	0.009	−0.019	0.004
	(0.008)	(2,265.327)	(0.013)	(0.023)	(0.008)
Ind. Contractor	0.099^{***}	$-16,535.960^{***}$	0.005	-0.155^{***}	0.035^{***}
	(0.002)	(663.877)	(0.004)	(0.007)	(0.002)
On Call	0.202^{***}	$-4,483.500^{***}$	-0.024^{***}	-0.083^{***}	0.015^{***}
	(0.004)	(1,197.237)	(0.007)	(0.012)	(0.004)
Observations	221,270	91,984	221,270	91,984	221,270
R^2	0.073	0.164	0.227	0.174	0.024
Adjusted R^2	0.068	0.154	0.223	0.164	0.019

Note: *p<0.1; **p<0.05; ***p<0.01
Wage income and insurance variables calculated for workers
who did not change jobs after their CWS interview
and were more than four months into their CPS rotation.
Controls: Age, Education, Sex, Race, Occupation, Industry, Metro area, usual hours worked.
Control for family income in all but regressions 2 and 3.

Table 4: Effect of Competition Shocks on Alternative Work Share

	Dependent variable:				
	Δ in %age of population employed in AWAs				
	(1)	(2)	(3)	(4)	(5)
Δ in Imports/Worker - IPW$_{uit}$	2.764***	3.008***	3.224***	3.207***	3.203***
	(0.462)	(0.493)	(0.509)	(0.511)	(0.512)
% Employment in Manufacturing		−5.743*	−4.888	−5.677	−3.820
		(3.372)	(4.542)	(4.981)	(6.843)
% Pop. College Educated				5.313	4.727
				(7.191)	(7.360)
% Pop. Foreign Born				−3.786	−3.354
				(4.746)	(4.881)
% Female Employment				0.599	0.231
				(7.292)	(7.368)
% Workforce in Routine Tasks					−7.809
					(19.780)
Time Trend	0.356***	0.290**	0.259**	0.238*	0.229*
	(0.109)	(0.117)	(0.121)	(0.124)	(0.127)
	First Stage: Effect of IPW_{oit} on IPW_{uit}				
	1.056***	1.035***	1.046***	1.053***	1.053***
	(0.035)	(0.037)	(0.038)	(0.038)	(0.038)
Census Division Dummies	*No*	*No*	*Yes*	*Yes*	*Yes*
Observations	192	192	192	192	192
R^2	0.405	0.409	0.416	0.421	0.421
Adjusted R^2	0.399	0.399	0.384	0.378	0.376

Note: *p<0.1; **p<0.05; ***p<0.01
AWA shares calculated using the CPS Supplement Weights.
Other shares calculated using the Final Weights or CBP Data.

Table 5: Effect of Trade Shocks on Contract Share

	Dependent variable:			
	Contract	Temp Agency	Ind-Con	On Call
	(1)	(2)	(3)	(4)
Δ Imports/Worker - IPW$_{uit}$	0.201***	0.381***	2.135***	0.503***
	(0.076)	(0.091)	(0.375)	(0.163)
% Employment in Manufacturing	2.068**	−0.714	−1.546	−3.704*
	(1.021)	(1.211)	(5.003)	(2.180)
% Pop. College Educated	−0.666	0.038	6.407	−1.168
	(1.098)	(1.303)	(5.381)	(2.345)
% Pop. Foreign Born	0.678	−0.468	−1.416	−2.255
	(0.728)	(0.864)	(3.568)	(1.555)
% Female Employment	1.037	0.168	−1.071	0.169
	(1.099)	(1.304)	(5.387)	(2.348)
% Workforce in Routine Tasks	−10.467***	−2.525	0.938	3.712
	(2.951)	(3.501)	(14.462)	(6.303)
Time Trend	−0.031	−0.035	0.226**	0.067
	(0.019)	(0.022)	(0.093)	(0.040)
	First Stage: Effect of IPW_{oit} on IPW_{uit}			
	1.053***	1.053***	1.053***	1.053***
	(0.038)	(0.038)	(0.038)	(0.038)
Census Division Dummies	*Yes*	*Yes*	*Yes*	*Yes*
Observations	192	192	192	192
R^2	0.148	0.133	0.424	0.183
Adjusted R^2	0.080	0.065	0.378	0.118

Note: *p<0.1; **p<0.05; ***p<0.01
All shares calculated using the CPS Supplement Weights.
Other shares calculated using the Final Weights or CBP Data.

Table 6: Effect of AWA Rates on Inequality - Income Share

	Dependent variable:			
	Top 5% Inc.		Top 1% Inc.	
	OLS	*IV*	*OLS*	*IV*
	(1)	(2)	(3)	(4)
Δ AWA Share	0.217**	3.325**	0.241***	3.052**
	(0.089)	(1.436)	(0.083)	(1.305)
Census Division Dummies	*Yes*	*Yes*	*Yes*	*Yes*
Controls	*Yes*	*Yes*	*Yes*	*Yes*
Observations	192	192	192	192
R^2	0.133	-5.927	0.158	-5.355
Adjusted R^2	0.059	-6.518	0.086	-5.897

Note: *p<0.1; **p<0.05; ***p<0.01
All shares calculated using the CPS Supplement Weights.
Other shares calculated using the Final Weights or CBP Data.
Controls include: Linear Trend, % Manufacturing Employment
% Foreign Born Female Employment, % College educated,
% Workforce in Routine tasks, Change in % Manufacturing.

Table 7: Effect of AWA Rates on Inequality - Income Share

	Dependent variable:			
	Theil		Gini	
	OLS	*IV*	*OLS*	*IV*
	(1)	(2)	(3)	(4)
Δ AWA Share	0.005	0.133**	0.002**	0.028**
	(0.003)	(0.058)	(0.001)	(0.012)
Census Division Dummies	*Yes*	*Yes*	*Yes*	*Yes*
Controls	*Yes*	*Yes*	*Yes*	*Yes*
Observations	192	192	192	192
R^2	0.104	-8.065	0.209	-4.776
Adjusted R^2	0.027	-8.838	0.141	-5.268

Note: *p<0.1; **p<0.05; ***p<0.01
All shares calculated using the CPS Supplement Weights.
Other shares calculated using the Final Weights or CBP Data.
Controls include: Linear Trend, % Manufacturing Employment
% Foreign Born Female Employment, % College educated,
% Workforce in Routine tasks, Change in % Manufacturing.

Table 8: Micro-level trade shocks - Manufacturing Workers

	Dependent variable:				
	Probability of being in AWA				
	(1)	(2)	(3)	(4)	(5)
Δ Imports/Worker - IPW$_{uitj}$	-0.027	-0.028^{*}	-0.027	-0.027	-0.029
	(0.017)	(0.017)	(0.017)	(0.017)	(0.019)
Year FE	No	Yes	Yes	Yes	Yes
Educ FE	No	Yes	Yes	Yes	Yes
Race FE	No	No	Yes	Yes	Yes
Hispanic FE	No	No	Yes	Yes	Yes
Citizen FE	No	No	Yes	Yes	Yes
Age	No	No	No	Yes	Yes
Sex FE	No	No	No	No	Yes
Aggregated Occupation FE	No	No	No	No	Yes
First Stage	0.576^{***}	0.633^{***}	0.633^{***}	0.633^{***}	0.633^{***}
	(0.004	(0.004)	(0.004)	(0.004)	(0.004)
Observations	25,935	25,935	25,935	25,935	25,935
R^2	-0.00000	0.002	0.002	0.002	0.006
Adjusted R^2	-0.00004	0.001	0.001	0.001	0.005

Note: *p<0.1; **p<0.05; ***p<0.01
All regressions are linear probability model.

Table 9: Micro-level trade shocks - Manufacturing Workers

	Dependent variable:			
	Ind. Con	Contract Co	Temp Agency	On Call
	(1)	(2)	(3)	(4)
Δ Imports/Worker - IPW$_{uitj}$	-0.039^{***}	-0.005	0.021^{**}	-0.004
	(0.011)	(0.006)	(0.010)	(0.006)
First Stage	0.633^{***}	0.633^{***}	0.633^{***}	0.633^{***}
	(0.004)	(0.004)	(0.004)	(0.004)
Observations	24,745	24,745	24,745	24,745

Note: *p<0.1; **p<0.05; ***p<0.01
All regressions are linear probability model
All regressions include fixed effects for
Race,Year,Hispanic,Citizen,Aggregated Occupation,Education,Sex, and Age.

Table 10: Effect of Trade Shocks on Outcomes - Non-AWA Employees only

	Dependent variable:			
	Hours Worked	Inc. $>60,000$	Variable Hours	Employer Insurance
	(1)	(2)	(3)	(4)
Δ Imports/Worker - IPW$_{uijt}$	1.837^{***}	0.064^{*}	-0.028	0.112^{***}
	(0.607)	(0.036)	(0.017)	(0.041)
First Stage	0.623^{***}	0.623^{***}	0.623^{***}	0.597^{***}
	(0.004)	(0.004)	(0.004)	(.007)
Observations	23,597	23,597	23,597	9,103
R^2	0.090	0.201	0.004	0.555
Adjusted R^2	0.088	0.200	0.003	0.553

Note: *p<0.1; **p<0.05; ***p<0.01
All regressions are linear probability model
All regressions include fixed effects for Race Year Hispanic,Citizen,Aggregated Occupation,Education,Sex,Age.
Does not include AWA Workers.
Employer Insurance determined by outgoing rotation group.