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Contract Employment as a Worker Discipline Device

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ABSTRACT

Contract Employment as a Worker Discipline Device*

Fixed-term contract employment has increasingly replaced regular open-ended employment as the predominant form of employment notably in developing countries. Guided by factory-level evidence showing nuanced patterns of co-movements of regular and contract wages, we propose a two-tiered task based model with self-enforcing contracts in which firms allocate complex tasks to long term employees at incentive compatible wages, and routine tasks to fixed term employees at acceptable wages. We show that the advent of contract employment effectively lowers the cost of maintaining worker discipline, and demonstrate the conditions under which a positive change in labor demand can end up increasing the share of contract employees. We then argue that the contract employment phenomenon sheds light on two margins of hiring distortions – respectively task assignment and total employment distortions – against which the effectiveness of a suite of oft proposed labor market exibility policies should be assessed.

JEL Classification: J31, J41, O43

Keywords: contract employment, two-tiered labor markets, wage polarization

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'Unlike the 3,178 pourakarmikas who are permanent employees ... the rest of the 18,000 sanitary workers are employed by solid waste management contractors. "My wife and I have been contract pourakamikas for 22 years."' *Times of India*, August 1, 2016.

1 Introduction

Contract labor, often referred to also as fixed-term contract work, temporary employment, or subcontracted work, is a global phenomenon. These are workers hired at a fixed-term basis with no guarantee, either contractual or legal, of permanent employment. Contract employee status typically carries a wage penalty, and offers less job security (ILO 2015). Globally, there is a great deal of disagreement concerning how best to regulate contract work, and related national legislations are not at all uniform. About 40% of all countries worldwide do not impose any limitation on contract employment (Doing Business 2016). The other 60% either impose a ban on contract work in permanent tasks, impose restrictions on the maximal time duration of contract work, or both (Table 1).

Recent labor market reforms in a number of European countries have legalized a two-tiered labor market setting in which regular workers' wages and job security continue to be protected by law, while the market for contract work has also been allowed to flourish (OECD 2004, 2006, ILO 2012).[1] In Spain and Germany, for example, respectively 25% and 15% of all wage employees are contract workers (Alexsynska and Muller 2016).

The co-existence of regular and contract workers is evident in developing country labor markets as well. In Bangladesh, for example, over 50% of the knitwear factories use contract labor (Chan 2013). In Latin America, the share of contract workers ranges widely with some of the highest figures recorded at around 30% in Chile and Peru for example (Alexsynska and Mueller 2016). In Indian manufacturing, studies have shown that regular and contract employment co-exist at the factory level. Over 65% of the man days hired in Indian manufacturing is carried out by contract laborers among factories that hire at least some contract laborers (Ramaswamy 2013, Soundararajan 2015) in the last decade. Furthermore, widespread contract employment in India in recent years and endemic wage polarization between regular and contract workers were seen as catalysts that instigated a number of high profile and in some cases violent labor disputes (Seghal 2012, Gulati 2012).

While there is evidence abound that contract employment is a central issue in developing

[1] See also Cahuc and Postel-Vinay (2002), Bentolila et al. (2011) and Boeri (2011) for in depth analyses for the cases of France, Spain and Italy respectively.

and developed country labor markets, the literature has yet to develop a coherent understanding about the drivers of contract employment, and the consequences of it proliferation on regular and contract labor alike. To start, the canonical task approach to the labor market (Acemoglu and Autor 2011, Autor 2013) is a natural framework for analysis, since the practice of contract employment can be seen simply as the subcontracting of production tasks and processes to supplement the work accomplished by regularly hired workers. Indeed, a parallel literature on the phenomenon of international offshoring exists, where arguably the only difference compared to contract work is that subcontractors are sourced globally instead of locally.[2] In a highly influential paper, Grossman and Rossi-Hansberg (2008) demonstrate that tasks offshoring gives rise to productivity gains that can trickle down and benefit domestic workers in the form of higher wages. Notably, evidence of total factor productivity improvements due to contract employment have indeed been observed in a developing country context, for example in Bertrand, Hsieh and Tsivanidis (2015). The same study shows, however, that that regular wages decreased as a consequence. Ahsan and Pagès (2007) examine the impact of lagged contract employment on average earnings per worker at the state-industry level in India, and likewise found a negative (though not significant) relationship. A first conceptual challenge about contract work thus relates to why productivity gains from contract employment may fail to translate into wage gains for regularly hired workers.

A second conceptual issue concerns wage polarization between contract and regular work. Since contract workers face higher transition probability to unemployment, and are not eligible for many of the benefits enjoyed by regular workers, all else equal, these workers should demand a compensating differential in the form of higher wages (Smith 1776, Rosen 1986).[3] Yet, a two-tiered wage structure persists in which a contract wage penalty applies. This ranges from 30 - 60 percent in developing countries, to 1 - 34% in developed countries (ILO 2015). The two-tiered wage structure adds new dimensions to the canonical task based model of the labor market. In particular, wage polarization in the context of contract work is driven by contractual heterogeneity, as opposed to skill heterogeneity in the canonical model.[4] What gives rise to the need for a two-tiered contractual structure within the same firm? Equally important, what explains the failure for contract wages

[2] For that reason, in fact, contract labor has also be commonly referred to as in-contracting (Fair Wear Foundation 2004, Veritè 2012).

[3] Along similar veins, in two-tiered labor market model of Eswaran and Kotwal (1985), for example, permanent workers enjoys implicit insurance throughout the year, while casual workers are only employed in peak periods depending on demand conditions. For the implicit insurance they receive throughout the year, permanent workers willingly accepts lower pay in these contracts.

[4] Indeed, there has been a wave of court rulings to regularize contract workers, both in private establishments (Business Standards 2014) as well as in government departments in India (The Hindu 2014).

to catch up with regular wages despite the popularity of contract employment?

This paper formulates a model of the labor market in which the subcontracting of tasks to lower wage workers on a temporary basis co-exists with the employment of regular workers at a wage premium and on a long term open-ended basis. To do so, we bring together a task-based model of the labor market and a two-tiered wage structure motivated by efficiency considerations. The rationale for this setup is two-fold. By incorporating contract employment as an assignment problem which allocates heterogeneous tasks of differing levels of complexity to regular and contract workers, this model reproduces a setup in which the gains from efficient task allocation can be directly passed on to workers (Grossman and Ross-Hansberg 2008). We then endogenize wages and employment in a setting where workers' individual effort cannot be directly monitored. Wage polarization occurs when employers offer regular contracts in rationed quantities promising high wage long-term employment for the completion of relatively complex tasks, as well as fixed term contracts at low wages and no promise of job security for the completion of all remaining tasks. The efficiency wage approach to labor market segmentation has a long tradition (e.g. Stiglitz 1974, Shapiro and Stiglitz 1984, Saint Paul 1996), and is fitting in our context for it simultaneously accounts for the permanent nature of regular employment, the higher wage that regular workers receive, and as we will illustrate, the equilibrium co-existence of regular workers, contract workers, and involuntary unemployment.

The main findings of this paper are three. First, we find that in general equilibrium, the practice of contract employment can facilitate the maintenance of regular worker discipline at strictly lower cost. Effectively, by diverting tasks previously accomplished by regular workers to contract workers, the likelihood that any job seeker will be able to find a regular job decreases. This makes it possible for employers to lower the regular wage with no perverse effort consequences. As regular workers exert equal effort at lower wages, the discounted value of regular work falls, and with it, the discounted value of all job seekers also falls. Thus, in ways orthogonal to the predictions from the task offshoring literature discussed above, but consistent with the labor disputes that broke out allegedly because of employer-worker conflicts over the issue of contract labor, we find that the distributional consequences of contract employment is indeed stark, with employers being strict winners, while all workers strict losers.

Second, we investigate both theoretically and empirically for the case of India how the mix of contract and regularly employees at the factory level changes in response to any exogenous increase in the demand for labor. To date, empirical studies on the determinants of the mix of contract and regular employees have exclusively focused on the role of polarized contract and regular wages, where various measures of employment protection legislations are used as proxies for wage polarization between regular and contract workers.[5] We have limited understanding about the forces that drive wage polarization between regular and contract workers to begin with. Our analysis adds to this discourse and shows that in fact wage polarization is itself a byproduct of the hiring decisions of employers.

Specifically, we account for two possibilities. The first arises when the time and effort cost of contract employment deters job search, and negatively impacts the likelihood of subsequent regular employment once the fixed term contract expires (e.g. Rogerson, Shimer and Wright 2005, Chau 2016). In this case, a rise in labor market tightness drives up the regular wage, and prompts contract workers to demand a higher wage as compensating differential. Wage polarization between regular and contract workers thus attenuates if contract wage catches up sufficiently. By contrast, if workers view contract employment as a step along the job ladder to eventual regular employment, for example, when contract workers fill entry level positions that feed into a firm's long term employment pool (e.g. Cahuc and Postel-Vinay 2002), contract workers will lower their wage demands in order to gain a short cut to regular employment in response to the same rise in the regular wage driven by labor market tightness. In this case, an increase in the demand for worker effort unambiguously give rise to more polarized wages.

We write a model that accounts for both the search deterrence and the job ladder perspectives. Indeed, available evidence supports such an approach. For example, in select European countries where data is available, the average likelihood of regularization of a contract worker ranges from 5 - 7% in France and Spain, to 38 to 47% in Germany and Austria (Alexander and Muller 2016). These relatively high likelihoods of regularization are consistent with a majority of the studies so far in the context these European countries that view contract work as a stepping stone to regular employment (Blanchard and Landier 2002, Belot, Boone and van Ours 2007, Boeri 2012, and Güell and Mora 2015).

Similar evidence in the developing country context is thin, and limited to a small number of select cases. For example, a report by the International Commission for Labor Rights revealed that even after years of doing the same jobs as regular workers in an Indian auto factory, contract workers have only a small chance of being absorbed as regular workers (International Commission for Labor

[5]For example, Sapkal (2016) finds that contract labor hiring rises with stricter employment protection laws and enforcement. Chaurey (2015) examines the hiring of contract labor with respect to demand shocks depending on the strictness of employment protection legislation. Early, though with focus on total employment only, Besley and Burgess (2004) studies the role of employment regulations on employment, investment, output and productivity.

Rights 2013). The Times of India (2016) reported on cases of seemingly permanently temporary employment of contract workers in India at low wages and benefits alongside regular workers with permanent employment status and higher wages and benefits. These anecdotal evidence of low regularization likelihood among contract workers contrasts sharply with the job ladder view of contract employment, and suggests instead the possibility that contract employment may at best leave unchanged, or worse deter workers' ability search for regular jobs. In Section 2, we take these questions to the data using factory-level data on Indian manufacturing. We argue across Indian manufacturing industries, the evidence does indeed suggest a spectrum of different regularization likelihoods among contract workers.

Our third set of results provides a series of efficiency and distributional implications of contract employment. At the level of the firm, we draw attention to two types of hiring distortions: task assignment distortion, and total employment distortion. We find that an unregulated equilibrium is inefficient in the sense that it deviates from first best labor allocation in the presence of an artificially high regular wage. Pure efficiency gains can be had through government interventions that increases total employment, while at the same time allocating a greater share of tasks to be accomplished by regular workers. We then contrast these first best prescriptions with a suite of labor market flexibility policies: employment protection legislation, unemployment insurance, and active labor market policies. What we find is that each of these three policies can only correctly address one of the two aforementioned sources of distortions, while reinforcing the remaining distortion. The main takeaway from our policy analysis is thus the need to recognize that piecemeal policy reforms typically have ambiguous efficiency consequences, for they are not designed to correct for both sources of distortions required to achieve the first best outcome.

This paper contributes to several areas of research. The determinants of wage polarization in the labor market has been a longstanding area of research inquiry. Studies have ranged from institutional and firm-specific determinants such as contractual dualism (Eswaran and Kotwal 1985, Basu, Chau and Kanbur 2015), minimum wages (Fields 1974), efficiency wage considerations (Shapiro and Stiglitz 1984), fair wage concerns (Akerlof and Yellen 1998), and firm heterogeneity (Helpman, Itshoki and Redding 2010), to name a few. A separate literature addresses wage inequality determined by worker characteristics, such as skill (e.g. Harrison 2006), gender (Blau and Kahn 2016) and immigration status (Card and Shleifer 2009), for example. Studies on the relationship between wage polarization with contractual heterogeneity *within the firm* among similar workers is very rare, however. This paper contributes to this broad literature by singling out wage polarization as both a determinant and an outcome of the coexistence of contract work and regular work, and by addressing the efficiency implications of efforts to address wage inequities that exist within the firm.

This paper also contributes to the literature on task offshoring. In this literature, the focus has been the determinants of offshoring (Jones and Kierskowski 1990) and the impact of offshoring on output and local wages (Feenstra and Hansen 1996, Grossman and Rossi-Hansberg 2008). Few studies, however, deal with the endogeneity of the extent of relative wage advantage of subcontracted work both domestic and international. Cazes and de Laiglesia (2015) is one exception that finds a positive relationship between wage polarization and the share of temporary contract workers, using the interdecile ratio D9/D1 of wage earnings as the measure of wage inequality. To this literature, our study provides the first conceptual setting that distinguishes between subcontracting work domestically and internationally, and a first empirical examination of this issue with India as a case in point.

Finally, there is an important literature specifically on contract work as a response to employment protection legislation such as firing restrictions in a developed country context. Saint Paul (1996) is a pioneering study in this literature in which a model of efficiency wage is used to explain the difference in wages but contract workers are hired at an exogenously given wage. There are a number of key features of the models in this literature (e.g. Saint Paul 1996, Cahuc and Postel-Vinay 2002, Boeri 2011, Güell and Mora 2015): employers hire entry level workers via fixed term contracts that are stepping stones for subsequent regular employment; entry level workers are paid an exogenously given or a fully enforced minimum wage, and the contract employment share is bounded upwards even though employers strictly prefer low wage contract workers due to contract employment legislation.[6] In our setting, contract workers do not enjoy a fully enforced minimum wage. We show an unregulated equilibrium in which both the contract wage and contract employment are endogenously determined, as regular and contract employment co-exist. Furthermore, we provide both anecdotal and factory-level evidence that, together with the predictions of the model, support the need to examine both the search deterrence and job ladder perspectives of the role of contract employment in affecting regularization likelihoods.

The next section provides narratives on contract labor employment in India and more specifics

[6]For example, Cahuc and Postel-Vinay (2002) formulates a matching model of contract work. In this model as well, employers strictly prefer hiring contract workers and the actual share of contract employment is fixed by law. Boeri (2011) provides a model of contract employment as entry level work, where employers strictly prefer contract workers due to lower wage cost, but the actual level of contract employment is exogenously given due to government regulations.

on the broad features of the data that motivated our work. Section 3 formulates the model and defines the equilibrium, and explores the efficiency and distributional properties of the equilibrium. Section 4 concludes and discusses the policy implications of our findings.

2 Contract Labor Employment in India

Contract employment in Indian manufacturing is a particularly useful case for a number of reasons. First, the Indian labor market is regulated by national level labor legislations that clearly defined a firm's obligations to regular employees. The Industrial Disputes Act of 1947 governs labor relations in firms employing 100 or more workers. State governments can make amendments to central legislations, and enforcement of employment protection legislation can vary significantly across states (Sapkal 2016, Besley and Burgess 2004). In particular, the Act prohibits forced layoffs without permission from the state. Violations carry a substantial fine and prison sentence. Employees are eligible to severance pay and other benefits.

Second, contract employment is legal in India, although contract workers are not covered by the Industrial Disputes Act. These workers are defined in legal terms as temporary workers who are paid for less than 240 days in any 365 day period, and are protected under the Contract Labor Regulation and Abolition Act of India. The Contract Labor Act grants the state the authority to ban the use of contract labor in any establishment, and makes provisions to protect workers in case of wage payment delays (Rajeev 2010, Deshpande et al. 2004). Enforcement of these regulations is weak, however, and the practice of contract labor has become increasingly widespread. (Bhandari and Heshmati 2008).

Third, factory-level data on the regular and contract employment, as well as regular and contract wages are available from the Annual Survey of Industries (ASI) in India. The ASI contains data on both the employment and wage dimensions of factory-level hiring of regular and contract workers in 40 manufacturing industries from 1998-2011. Figure 1a presents Kernel density plots of the share of contract man days in total man days in an industry by state in 1999 and in 2009. As shown, the share of contract work is nontrivial, and this share is growing over time. Averaging across industries and years, the share of contract man days in total man days rose from 27% in 1998 - 2005 to 38% in 2005-2011 (Table 2).

Figure 1b presents Kernel density plots of the regular and contract wages during the same time periods. Evidently, there is indeed a contract wage penalty, and this penalty has persisted despite the popularity of contract work. Averaging across industries and years, the regular wage has risen from 127 rupees per man day in 1998 - 2005 to 207 rupees per man day in 2005-2011 (Table 2). Contract wages have also risen, from 85 rupees per man day in 1998-2005 to 142 rupees per man day in 2005-2011. However, the contract to regular wage ratio, our measure of wage polarization, registered only a very small change from 0.729 to 0.745 between these two periods.

To examine the determinants of the regular wage, we follow Shapiro and Stiglitz (1984) and specify the regular wage as a function of the likelihood that an unemployed individual will find a regular job, denoted n_{skt} at time t, state s, and industry k:

$$w^r_{iskt} = \bar{w}^r_{isk} + D_{isk} n_{skt}. \tag{1}$$

where $\bar{w}^r_{isk}$ is the minimal reservation wage that regular workers in firm i would demand, to compensate for the effort cost of regular work for example, depending among other things on the turnover likelihood of regular employment. In the standard Shapiro and Stiglitz setting, n_{skt} captures the tightness of the labor market. The higher n_{skt} is, the higher the incentive compatible regular wage will need to be in order to elicit worker effort in the absence of perfect monitoring capabilities on the part of employers, and thus the term D_{isk} is predicted to be strictly positive.

While a direct measure of the labor market tightness n_{skt} is not available, for each firm i, we follow the approach in Beaudry et al. (2014) and use the observed log weighted average regular wage of all firms in the same state and industry excluding firm i, henceforth $\ln Ew^r_{-iskt}$, as a proxy for labor market tightness n_{skt} facing firm i:

$$Ew^r_{-iskt} = \sum_{j \neq i} \omega_{jskt} w^r_{jskt}.$$

Ew^r_{-iskt} is the weighted average regular wage of all firms that share the same state-industry class as firm i in time t, and ω_{jskt} denotes the weight applied to each firm j. The main motivation here is that w^r_{-iskt} measures the outside option of workers considering regular employment in firm i. Indeed if each of these firms set wages according to (1), then Ew^r_{-iskt} has the advantage that it monotonically tracks n_{skt} without conflating any wage variations originating in firm i.

To ascertain responsiveness in elasticity terms, we estimate the following log regular wage equation:

$$\ln(w^r_{iskt}) = d^r_{isk} + d^r_{st} + d^r_{kt} + \rho^r_n \ln Ew^r_{-iskt} + \rho^r_x x_{iskt} + \upsilon_{iskt}, \tag{2}$$

where d^r_{isk} captures time invariant fixed effects at the factory level, as well as at the state and industry levels. We do so to allow for systematic establishment level differences, as well as state- and industry-specific differences in labor regulation for example (e.g Besley and Burgess 2004). We also include state and industry time trends d^r_{st} and d^r_{kt} to control for policy shifts such as changes in the minimum wage or enforcement intensity, and other state level amendments to national labor regulations over time. Also included is a list of factory-level determinants including location in rural / urban areas, ownership, and capital-labor ratio. υ^r_{iskt} is a firm-specific error term with zero mean.[7]

In symmetric fashion, we estimate the determinants of the contract wage as follows:[8]

$$\ln(w^c_{iskt}) = d^c_{isk} + d^c_{st} + d^c_{kt} + \rho^c_n \ln Ew^r_{-iskt} + \rho^c_x x_{iskt} + \upsilon^c_{iskt}. \tag{3}$$

Note that efficiency wage theory predicts that ρ^r_n is strictly positive, for the incentive compatible regular wage should rise with labor market tightness. While we have yet to present a theory on the sign and significance of the contract wage elasticity ρ^c_n, it follows from (1) and (2) that if and only if $\rho^c_n < \rho^r_n$, an increase in labor market tightness will give rise to more polarized wages between contract and regular employment as the contract to regular wage ratio decreases with labor market tightness.

We present two sets of results, respectively from a pooled regression including all industries (Table 3), and from 2-digit industry regressions for the five largest industries in employment terms (Table 4).[9] We use the simple average regular wage in all but the current firm as our measure of labor market tightness in these Tables. In Appendix Tables 1 and 2, we produce results using mandays weighted averages. The results are quantitatively similar. Two observations are immediately evident. First, consistent with Shapiro-Stiglitz predictions, the regular wage responsiveness to labor market tightness is positive and highly significant in all specifications in Table 3, with estimated ρ^r_n ranging from 0.035 to 0.038 with factory fixed effects. This is after accounting for state and industry time trends, as well as factory-level controls.

Second, the estimates summarized in Tables 3 show that the contract wage elasticity with respective to labor market tightness is likewise positive and statistically significant in the pooled regression. This is supportive of the search deterrence perspective discussed earlier − contract

[7]Factory-level control variables include (i) dummy to indicate firm location in rural or urban areas, (ii) dummy variables for firm size (0 =size< 50 workers, 1 =size between 50 and 100, 2 = 100 and above), (iii) capital labor ratio of the firm, (iv) dummy variables for type of organization (1 = Individual Proprietorship, 2 = Joint Family, 3 = Partnership, 4 = Public Limited Company, 5 = Private Limited Company, and t = Governmental departmental enterprise, Public Corporation by Special Act of Parliament or State Legislature Of PSU, Cooperatives, Khadi and village industries commission, handlooms, others.

[8]A natural question at this point is why the average contract wage is not included in addition to the average regular wage to capture labor market tightness. We will have a chance to address this question later in Section 3, where it will be demonstrated that even in a model of worker discipline augmented with contract labor, the equilibrium wage equations for regular and contract labor follows the reduced form in (2) and (3).

[9]These include food products and beverages, textiles, chemical and chemical products, other non-metallic mineral products, and basic metals.

workers do demand higher wages to compensate for regular wage forgone. That said, note that regular wage elasticities with respect to labor market tightness are strictly higher than contract wage elasiticities ranging from 0.011 to 0.013 with factory fixed effects. As such, contract and regular wages are *more* polarized when labor market tightens.

Results from industry level regressions suggest a interestingly diverse set of findings. For example, in the food products and beverages sector as well as the textile sector – the former being the largest 2-digit industrial sectors in our data in employment terms – both the regular and contract wage elasticities with respect to labor market tightness are positive. In both cases, the regular wage elasticity is strictly greater than the contract wage elasticity. This is once again consistent with the job deterrence perspective, but where contract-regular wage polarization nonetheless intensifies with rising labor market tightness. In non-metallic mineral products and basic metals, the regular wage respond positively to labor market tightness, but the contract wage coefficient is not statistically different from zero throughout. This lack of responsiveness of the contract wage to labor market tightness suggests that workers behave as though they do not demand a higher wage when labor market tightness drives the regular wage upwards. That said, the overall message that can be gleaned from Tables 3 and 4 is that wage polarization between contract and regular workers intensifies whenever the labor market tightens.

In summary, the Indian example highlights a number of features of the two-tiered labor market in which both regular and contract workers co-exist. First, while regular employment confer added benefits such as lower turnover, a persistent wage gap nonetheless exists between regular and contract workers. This is contrary to the prediction of a Smithian compensating differential, in which workers are willing to take a wage discount in exchange for the extra benefits such as job security.

Second, despite the wage cost savings and contractual flexibility associated with contract employment, there is not a single sector where regular employment has ceased to exist. This provides suggestive evidence that there may be productivity consequences associated with the choice of contractual forms that may not be immediately evident from this survey of the data.

Third, regular wage always rises in response to local labor market tightness, while the contract wage may respond positively or not at all. Furthermore, in all cases, the contract wage responds at a slower pace relative to the regular wage (Tables 3 and 4). Importantly, this suggests that wage polarization between contract and regular workers does not improve when demand for worker effort rises.

Motivated by these salient features, we now proceed to construct a model of a two-tiered labor market of regular and contract workers, in which the underlying mechanics of each of the above observations can be fleshed out.

3 A Two-tiered Labor Market of Regular and Contract Work

We study a labor market equilibrium in which regular and contract workers coexist at the level of the firm. Regular workers receive long-term employment contracts that are interrupted only by unanticipated termination. Contract workers receive fixed-term contracts. Regular workers furthermore receive incentive compatible wages generous enough to induce high effort. Contract workers, by contrast, are just high enough to induce participation. Between unemployment and contract employment, contract workers weigh the tradeoffs between receiving the contract wage or no wage at all, and the relative likelihood of regular employment at the end of the contract period.

3.1 Workers and Effort

The model is set in discrete time. At each time period, there is a constant pool of N identical workers and three employment states: regular employment (r), contract employment (c), and unemployment (u). The utility ($U(w, e)$) of a worker depends on wage income w and work effort e that period, $U(w, e) = w - e$.

Regular Employment

A worker in regular employment receives w_r and chooses between a high level of effort $e_r > 0$ required for the job to be completed, or a baseline effort level at $e_o < e_r$. $e_o \geq 0$ denotes the effort cost of showing up at work. Workers who select high effort face an exogenous probability of turnover in the following period $q > 0$, while workers who shirk may be discovered, and face a probability of separation $q + \sigma > q$ in the following period. The separation probability q is taken as given to the worker and the firm.[10]

Denote $V_r(e)$ as the steady state value function of a regular worker depending on his effort level, V_u the value function of an unemployed worker, and $\beta \in (0, 1)$ the time discount factor:

$$\begin{aligned} V_r(e_r) &= w_r - e_r + \beta(qV_u + (1-q)V_r(e_r)), \\ V_r(e_o) &= w_r - e_o + \beta(qV_u + (1-q)V_r(e_o)) - \beta\sigma(V_r(e_o) - V_u)). \end{aligned} \tag{4}$$

[10]In the Appendix, we endogenize the separation rate as a function of the cost of firing – a policy parameter to be chosen by labor standard authorities.

$V_r(e_r)$ and $V_r(e_o)$ differ in two regards. Shirking naturally generates effort savings ($e_r - e_o > 0$), but it also risks a higher likelihood of job loss upon discovery. In value terms, the cost of this risk is $\beta\sigma(V_r(e_o) - V_u)$.

Let n_r be the likelihood that an unemployed worker finds a regular job each period – henceforth the regularization rate of the unemployed. Also let $\bar{w}_o \geq 0$ denote the per period income, if any, that workers can earn while unemployed, for example, through self-employment. It follows that:

$$V_u = \bar{w}_o + \beta(n_r \max\{V_r(e_r), V_r(e_o)\} + (1 - n_r)V_u). \tag{5}$$

The minimal regular wage that elicits high effort, $w_r(n_r)$ is given by:

$$\begin{aligned} w_r(n_r) &= \min\{w_r | V_r(e_r) \geq V_r(e_o)\} \\ &= e_r + b + \frac{(1 - \beta(1 - q - n_r))(e_r - e_o)}{\beta\sigma} \\ &\equiv \bar{w_r} + n_r(e_r - e_o)/\sigma. \end{aligned} \tag{6}$$

Note that $w_r(n_r)$ depends on job and worker characteristics, such as the costs (both effort and opportunity) of undertaking regular employment $e_r + b$, the likelihood of separation and discovery of shirkers, q and σ, as well as the discount rate β in ways completely analogous to Shapiro and Stiglitz (1984), as well as the reduced form equation we employed earlier in (2) in Section 2. For example, as the separation rate q rises, the lure of a regular job is weakened and consequently a higher regular wage will be required to elicit high effort.

From (6), the regular wage responds to labor market forces through the regularization likelihood n_r. Specifically as n_r rises, the regular wage must rise in order to continue to incentive high effort.

Contract Workers

A contract worker receives w_c on a fixed-term (here, one period) basis. Fixed-term employment leaves no room for employers to incentivize effort through the threat of unemployment, and consequently all contract workers supply baseline effort e_o. Once employed, contract workers may be hired during the next period as regular worker, at probability $n_r(1 - \gamma)$, where $\gamma \leq 1$. If $\gamma > 0$, contract employment gives rise to a regularization likelihood deficit due, for example, to time spent at work instead of job searching. Alternatively, if $\gamma < 0$, contract employment facilitates regular employment due, for example, to proximity to and better information about job openings.[11]

[11] Since we are interested in labor markets where both regular and contract workers co-exist, throughout we focus

The value function of a contract worker is:

$$V_c \quad = \quad w_c - e_o + \beta(n_r(1-\gamma)\max\{V_r(e_r), V_r(e_o)\} + (1 - n_r(1-\gamma))V_u). \tag{7}$$

For contract employment to be at least as desirable as unemployment, the contract wage solves:

$$\begin{aligned} w_c(n_r) &= \min\{w_c | V_c \geq V_u\} \\ &= e_o + b + \gamma n_r(e_r - e_o)/\sigma \\ &\equiv \bar{w_c} + \gamma n_r(e_r - e_o)/\sigma. \end{aligned} \tag{8}$$

Thus, like the regular wage $w_r(n_r)$, the contract wage also responds to job and worker characteristics ($e_o + b$, σ), as well as to labor market tightness n_r. Notably however, unlike the efficiency wage $w_r(n_r)$, the contract wage $w_c(n_r)$) rises with n_r if and only if contract employment entails a regularization likelihood deficit $\gamma > 0$. Otherwise, if $\gamma < 0$, a tighter labor market in fact incentivizes workers to accept a pay cut in order to buy a higher likelihood of getting a regular job. γ thus parameterizes the extent to which contract employment deters or facilitates a workers' search for regular employment. Indeed, our example of the Indian labor market in Section 2 provides evidence that γ is likely industry-specific, for the contract wage responds positively in some or not at all in other industries to tighter labor market conditions (Table 4).

3.2 Employers

To address the labor demand consequences of such a two-tiered effort structure, we introduce a task-based model of labor demand to incorporate potentially task-specific productivity consequences of heterogeneous effort. For example, complex tasks may require the full attention of a worker, but routine tasks may be completed simply as a function of a worker showing up.

Accordingly, we assume an increasing and strictly concave aggregate production function $f(y) = y^{\alpha}, \ \ \alpha \in (0,1)$, yielding revenue $p_o f(y)$ at constant world price p_o. y is a composite labor input produced upon the completion of a continuum of tasks $y(i)$ on the unit interval $i \in [0,1]$. y is a constant elasticity of substitution aggregator function of all tasks performed:

$$y = \left(\int_0^1 y(i)^{\frac{\eta-1}{\eta}} di\right)^{\frac{\eta}{\eta-1}}.$$

where η is the elasticity of substitution. The output of each task $y(i)$ depends on a combination of the number of regular ($\ell_r(i)$) and/or contract ($\ell_c(i)$) workers employed for the task. In particular,

on interior solutions where $n_r(1-\gamma) \in (0,1)$.

we normalize units so that:

$$y(i) = \ell_r(i) + \ell_c(i)/a(i)$$

and thus one unit of regular work delivers one unit of task i, while $a(i)$ is the unit contract labor requirement of task i. We assume without loss of generality that $a(i)$ is increasing in i, with $a(0) = 1$. i may be interpreted as the rank order of the complexity / effort intensity of task i in [0,1], such that higher index i tasks are much costlier to accomplish when only contract workers are employed.

Given the monotonicity of the input requirement $a(i)$ in i, let I denote threshold task beyond which it is no longer cost minimizing to employ contract workers. Thus, for $i \in [0, I)$, the wage cost per unit $y(i)$ is simply $w_c a(i)$. Otherwise, the wage cost per unit $y(i)$ is w_r.

The decision problem of the employer is two-fold. First, the employer chooses I to minimize the unit cost of the composite labor input y, henceforth denoted as c_y. Next, the employer maximizes profits by choice of aggregate labor input y taking as given the unit cost of production c_y, and the output price p_o.

Task Assignment

Denote I as the threshold task such that an employer is strictly indifferent between hiring a contract or a regular worker:

$$I = \{i \in [0, 1] | \; w_c a(I) = w_r\}. \tag{9}$$

For all tasks $i > I$, it is cost minimizing to employ only regular workers. For all other tasks $i \leq I$, it is cost minimizing to employ only contract workers. The unit cost function c_y of the aggregate labor input solves $c_y = \min_{y(i)} w_r(n_r) \int_I^1 y(i)di + w_c(n_r) \int_0^I a(i)y(i)di$ subject to the constraint that $\int_0^1 y(i)di = 1$. It follows that

$$c_y(w_r, w_c) = \left(w_r(n_r)^{1-\eta}(1 - I^*) + \int_0^I (w_c(n_r)a(i))^{1-\eta} di \right)^{\frac{1}{1-\eta}}, \tag{10}$$

which is increasing in and homogeneous of degree 1 in $w_r(n_r)$ and w_c, but locally invariant to I since I is the cost minimizing threshold task.

Total Employment

Given $c_y(w_r, w_c)$, profit maximization at the factory level chooses a level of composite labor input $y(c_y, p_o)$, where

$$y(c_y, p_o) = \{y | \; p_o f_y(y) = c_y\} = (\alpha p_o / c_y)^{\frac{1}{1-\alpha}}$$

is a strictly decreasing function of c_y and increasing function of p_o. Furthermore, total regular and contract employment are given by:

$$\ell_r = \int_I^1 y(i)di \equiv \theta_r(I)y(c_y, p_o), \quad \ell_c = \int_0^I y(i)a(i)di \equiv \theta_c(I)y(c_y, p_o) \tag{11}$$

where $\theta_r(I)$ and $\theta_c(I)$ are respectively strictly decreasing and increasing function of the fraction tasks assigned to regular and contract workers:

$$\begin{aligned}
\theta_r(I) &\equiv (1-I)\left(1 - I + \int_0^I \frac{a(i)^{1-\eta}}{a(I)^{1-\eta}}\right)^{\frac{\eta}{1-\eta}}, \\
\theta_c(I) &\equiv \int_0^I a(i)^{1-\eta}di \left(a(I)^{1-\eta}(1-I) + \int_0^I a(i)^{1-\eta}di\right)^{\frac{\eta}{1-\eta}}.
\end{aligned}$$

Henceforth, we assume that total work force N is sufficiently large so that for every level of output in the range of relevant wages and prices to be characterized in detail in the sequel, there is enough workers to go around for all to be hired as contract workers:

$$N > \left(\int_0^1 a(i)^{1-\eta}di\right)^{1/(1-\eta)} y(c_y, p_o). \tag{12}$$

By doing so, we work with situations where regular employment is not a consequence of an aggregate labor supply constraint which forbids a high enough number of contract workers to be hired even if it is profit maximization to do so.

3.3 Equilibrium Conditions

A steady state equilibrium in this economy is a combination of regular and contract wages, an assignment of tasks I, and an allocation of workers $N_i, i = r, c, u$ such that two sets of conditions are satisfied. The first set requires that employers offer incentive compatible contracts, so that regular workers are paid the efficiency wage from (6)

$$w_r(n_r) = \bar{w}_r + n_r(e_r - e_o)/\sigma,$$

and contract workers are paid according to (8)

$$w_c(n_r) = \bar{w}_c + \gamma n_r(e_r - e_o)/\sigma.$$

The ratio $w_r(n_r)/w_c(n_r)$ gauges the extent of wage polarization between regular and contract workers. Since w_r and w_c are individually functions of the regularization rate n_r, their ratio also depends on n_r:

$$\frac{w_r}{w_c} = \frac{\bar{w}_r + n_r(e_r - e_o)/\sigma}{\bar{w}_c + \gamma n_r(e_r - e_o)/\sigma}. \tag{13}$$

Notably, an increase in labor market tightness may intensify or reduce the extent of wage polarization depending on the rate at which the contract wage keeps pace with the regular wage through the parameter γ. Henceforth, we say that

Definition 1. *A rise in labor market tightness n_r is strictly wage polarizing if and only if w_r/w_c is increasing in n_r. Equivalently, if and only if*

$$\gamma < \frac{w_c}{w_r}. \tag{14}$$

where (14) follows directly from (13). In Figure 2, the PP schedules display a family of such relationships between wage polarization and regular employment likelihood as γ successively increases from P_1P to P_2P. Thus, when γ is sufficiently small, a higher regular employment likelihood raises the efficiency wage for regular work, but the contract wage does not keep pace fast enough. Consequently, growth in regular employment further intensifies wage polarization in the labor market.

The second set of steady state equilibrium condition requires that inflows into regular employment from previously unemployed workers and workers in contract work ($n_r(N-\ell_r-\ell_c)+n_r(1-\gamma)\ell_c$) equals outflows into unemployment ($q\ell_r$) in such a way that regular employment is time invariant:

$$n_r = \frac{q\theta_r(I)}{N/y(c_y, p_o) - \theta_r(I) - \gamma\theta_c(I)}. \tag{15}$$

In Figure 2, the EE schedule displays the relationship between regular employment likelihood and equilibrium wage polarization, accounting for the profit maximizing choice that the threshold task I reflects the extent of wage polarization in the economy:

$$a(I) = \frac{w_r}{w_c}.$$

As shown EE is downward sloping.[12] Intuitively, as the ratio w_r/w_c increases, employers reassign tasks previously completed by regular workers to contract workers. This decreases the likelihood of getting a regular job.

[12]To see this, note that since I is chosen to minimize cost, $w_r\theta_r(I) + w_c\theta_c(I) = c_y$. It follows that

$$\theta_c'(I) = -\frac{w_r}{w_c}\theta_r'(I).$$

Totally differentiating the above to obtain the slope of n_r with respect to I, it can be readily verified that the sign of $\partial n_r/\partial I$ is given by the sign of the following expression:

$$-\left[N - \gamma(\theta_c(I) + \frac{w_r}{w_c}\theta_r(I))y(c_y, p_o)\right]$$

By cost minimization, $\theta_c(I) + \frac{w_r}{w_c}\theta_r(I) < \theta_c(1) \equiv= \int_0^1 a(i)^{1-\eta}di)^{1/(1-\eta)}$. Since $\gamma < 1$, it follows by assumption in (7) that the sign of $\partial n_r/\partial I$ is negative.

Starting from levels of wage polarization that are not too severe, with $w_r/w_c \to 1$, we have a benchmark where almost all workers are regular workers. At the limit, the unit cost of the aggregate labor input collapses to $c_y = w_r$, and n_r uniquely solves:

$$n_r^o = \{n_r | \frac{qy(w_r, p_o)}{N - y(w_r, p_o)} = \bar{w}_r + \frac{n_r}{\sigma}(e_r - e_o)\}.$$

At the opposite extreme, suppose instead that wage polarization is sufficiently severe, such that w_r/w_c evaluated at $n_r = 0$, or equivalently $(\bar{w}_o + e_r)/(\bar{w}_o + e_o)$, is greater than the unit labor requirement $a(1)$. In this case, there is no regular employment, and $n_r = 0$. Henceforth, we assume that $(\bar{w}_o + e_r)/(\bar{w}_o + e_o) < a(1)$, and consequently, there is a unique interior equilibrium where firms hire both types of workers.

3.4 Employment and Wages in a Steady State Equilibrium

Contract Employment as a Worker Discipline Device

The intersection of the wage polarization PP schedule and the employment equilibrium EE schedule gives the steady state equilibrium of this model.[13] Consider therefore the first question posed at the outset of this paper. Does the introduction of fixed term contract labor at low wages reinforce or disrupt worker discipline previously secured by long-term efficiency wages? To do so, we consider the impact that a ban on contract employment have on three metrics: (i) the efficiency wage (ii) the lifetime-discounted utility of workers in the three employment states and (iii) the expected profits of employers.

From (15), going from a regime where contract employment is banned to a deregulated regime, the regularization likelihood of unemployed workers strictly decreases from n_r^o to n_r^*. It follows immediately from (6) that this decrease in the regularization likelihood among the unemployed lowers the efficiency wage. Effectively, the practice of contract employment allows employers to enforce worker discipline among regular workers at a strictly lower efficiency wage as unemployment now poses a greater threat when some regular jobs have been replaced by contract work.

The combined effect of a reduction in the efficiency wage and the regularization likelihood means that the discounted value of regular worker V_r, as well as the discounted value associated with unemployment are now lower from (4). Since the value of contract work is equal to unemployment ($V_u = V_c$) is in equilibrium from (8), the value of workers who engage in country employment will also decline.

[13]Given the steady state values of n_r^* and w_r^*/w_c^*, equilibrium regular and contract can be retrieved from (6) and (8) respectively, the equilibrium marginal task assignment I^* follows from (9), and associated allocation of workers is given by (11).

By contrast, the reduction in wage cost raises output as the efficiency wage declines. Furthermore, profits $p_o f(y) - c_y y$, defined as revenue net of payment to workers, increases going from a regime where contract employment is banned to a deregulated regime. In summary:

Proposition 1. *A ban on contract employment increases the efficiency wage, raises the steady state discounted expected utility of all workers, and lowers steady state output and profits.*

Proposition 1 reiterates the seminal insight of the efficiency wage literature, namely, that the wage that employers must pay to maintain worker discipline is positively related to labor market tightness. Does it therefore follow that an exogenously driven increase in labor demand will unambiguously raise the efficiency wage relative to the contract wage? Starting from a interior equilibrium where both contract and regular employment co-exist:

Proposition 2. *An increase in demand for labor through p_o increases the regular wage. It increases the contract wage if and only if $\gamma > 0$. The share of employed workers with regular jobs decreases (increases) if and only if wage polarization w_r/w_c increases (decreases), or if and only if*

$$\gamma < (>) \frac{w_c}{w_r}.$$

Proposition 2 follows directly from (13). Since the elasticity of the regular and the contract wage with respect to labor market tightness differ depending on the magnitude and sign of the regularization likelihood deficit of contract workers γ, whether the wage polarization between regular and contract workers intensifies or not likewise depend on γ. In particular, if γ is sufficiently small, contract wages are slow to catch up to regular wages in response to an increase in labor market tightness n_r. Consequently, employers respond to an increase in labor demand by shifting to contract employment.

Returning to our analysis of the Indian manufacturing labor market in section 2, does a demand induced increase in labor market tightness give rise to an increase in thee share of contract workers? Proposition 2 finds that the answer to this question depends on whether the magnitude of the elasticity of the regular wage with respect to n_r is greater than the corresponding contract wage elasticity. In the India case from Tables 3 and 4, this is true overall from our pooled regression result, as well as in almost all of the largest sectors of employment considered there.

3.5 First-Best Policies

From Proposition 1, a ban on contract employment benefits workers but harms employers. It is thus unclear *a priori* as to whether the first best policies will favor a reduction of the share of contract employment. Starting from an interior equilibrium, define overall welfare W as the sum of producer profits $p_o f(y(c_y, p_o)) - c_y y(c_y, p_o)$ and per period utility of workers $(w_r - e_r)\theta_r y + (w_c - e_o)\theta_c y + \bar{w}_o(N - (\theta_r + \theta_c)y)$ in all three states of employment, we have the following:

$$W = \bar{w}_o N + p_o f(y) - (\bar{w}_o + e_r)\theta_r(I)y - (\bar{w}_o + e_o)\theta_c(I)y$$

Total welfare is the sum of the baseline earnings $\bar{w}_o$ of all N workers plus production revenue, net of the cost of employment including both opportunity ($\bar{w}_o$) and effort ($e_i,\ i = r, o$) costs.

The first-best policy is a combination of task assignment I^* and total employment y^* that maximizes aggregate welfare, W. These can be implemented by appropriate choice of subsidies to regular and contract workers, and tax on tasks allocated to contract workers, for example, as we will demonstrate. To determine I^* and y^*, note that at given y,

$$\frac{\partial W}{\partial I} = \theta_c'(I)\bar{w}_o \left(\frac{\bar{w}_o + e_r}{\bar{w} + e_o} - a(I) \right) \frac{w_c}{w_r}. \tag{16}$$

Thus, evaluated at the first-best marginal task (I^*), the unit societal cost (opportunity plus effort cost) of task $y(I^*)$ is the same whether contract or regular workers are used since $\bar{w}_o + e_r = (\bar{w}_o + e_o)a(I^*)$. This indifference may be broken, for example, at a corner solution, where the first best policy may prescribe a complete ban on contract employment if and only if $\bar{w}_o + e_r < (\bar{w}_o + e_o)a(0)$.

In the absence of policy interventions, note that since the efficiency wage is set high to incentivize effort, the market determined regular to contract wage ratio is strictly greater than the corresponding societal cost ratio of regular relative to contract workers:

$$a(I) = \frac{w_r}{w_c} = \frac{\bar{w}_o + e_r + (1 - \beta(1 - q - n_r))(e_r - e_o)/(\beta\sigma)}{\bar{w}_o + e_o + \gamma n_r)(e_r - e_o)/\sigma} > \frac{\bar{w}_o + e_r}{\bar{w}_o + e_o} = a(I^*).$$

It follows therefore that the first best policy always assigns a strictly narrower range of tasks to contract workers. Turning now to total employment, evaluated at the first best task assignment I^*,

$$\frac{\partial W}{\partial y} = p_o f_y(y) - (\bar{w}_o + e_r)\theta_r(I^*) - (\bar{w}_o + e_o)\theta_c(I^*). \tag{17}$$

which requires that the marginal product of the composite labor input be equated to its marginal societal cost. Once again since the regular wage is set high to induce effort, it can be shown that the marginal societal cost of a unit of y is less than the marginal wage cost evaluated at the marginal task chosen by employers I:[14]

$$(\bar{w}_o + e_r)\theta_r(I^*) + (\bar{w}_o + e_o)\theta_c(I^*) < w_r\theta_r(I) + w_c\theta_c(I)$$

we have thus:

Proposition 3. *The social welfare maximizing first best policy has two parts, requiring respectively (i) a restriction on the share of tasks allocated to contract workers, and (ii) an increase in overall employment y.*

In order to implement the first best policies above, a contract employment tax t^* leading to an after tax contract labor cost of $w_c(1+t^*)$, and an employment subsidy s^* leading to an after subsidy unit cost of $c_y(w_r, w_c(1+\tau^*))/(1+s^*)$ as shown below will accomplishment the task:

$$1 + t^* = \frac{w_r}{w_c} \Big/ \frac{\bar{w}_o + e_r}{\bar{w}_o + e_o}, \;\; 1 + s^* = \frac{w_r}{\bar{w}_o + e_r}.$$

Together, these reflect the task assignment and total employment distortions associated with the co-existence of contract employment and an efficiency wage.

3.6 Piecemeal Policy Alternatives

Following a rich literature on labor market institutions and associated policy reforms (e.g. Boeri 2011, Kahn 2010, and OECD 2006), we consider three types of labor market policy alternatives: unemployment insurance, active labor market policies, and employment protection legislation. We will discuss the intuition behind the labor market performance and social welfare implications of each of these three policies in what follows.

Unemployment Insurance

A longstanding debate on the effectiveness of unemployment insurance exists in which the benefits of such insurance (e.g. consumption smoothing and workers' ability to bargain for higher wages) are

[14]To see this, note that

$$\begin{aligned}(\bar{w}_o + e_r)\theta_r(I^*) + (\bar{w}_o + e_o)\theta_c(I^*) &< (\bar{w}_o + e_r)\theta_r(I) + (\bar{w}_o + e_o)\theta_c(I) \\ &= w_r\theta_r(I) + w_c\theta_c(I) - \frac{(1-\beta(1-q-n_r))(e_r - e_o)\theta_r(I)}{\beta\sigma} - \frac{\gamma n_r(e_r - e_o)}{\sigma} \\ &< w_r\theta_r(I) + w_c\theta_c(I).\end{aligned}$$

where the second inequality follows by virtue of cost minimization, and the last inequality follows from the definition of n_r in (15), where $n_r(\theta_r(I) + \gamma\theta_c(I)) = n_r N/y(c_y, p_o) - q\theta_r(I)$. Substituting this into the expression following the equality sign above yields the desired inequality.

compared with the associated potential costs such as higher unemployment (Shapiro and Stiglitz 1984, Acemoglu and Shimer 1999). For example in India, the Mahatma Gandhi Rural Employment Guarantee Scheme is a national policy that aims at providing workers with at least 100 days of employment per year. More generally, any labor market policy that raises the income of unemployed individuals, e.g. through education, training, or the provision of credit for business start-ups, can have impacts akin to unemployment insurance.

In our setting, unemployment insurance can affect both regular and contract employment. Indeed, wage polarization as measured by:

$$\frac{w_r}{w_c} = \frac{\bar{w}_o + e_r + (1 - \beta(1 - q - n_r))(e_r - e_o)/(\beta\sigma)}{\bar{w}_o + e_o + \gamma n_r(e_r - e_o)/\sigma}$$

is in fact strictly decreasing in $\bar{w}_o$. It follows that unemployment insurance disproportionately improve the ability of contract workers to bargain for higher wages. The result is a reduction in wage polarization – a shift of the PP schedule to the left – and accordingly a movement of the marginal task I closer to the first best outcome.

However, unemployment insurance directly raises employers' wage cost. Employers respond by reducing total employment y, in a direction away from the first best outcome.

With task assignment distortion and total employment distortion going in opposite directions relative to their respective first best levels, the social welfare implications of unemployment insurance is in general ambiguous.

Active Labor Market Policies

Popular in many countries for example in Western Europe, but also increasingly in many developing countries, active labor market policies are programs designed to assist workers in the job search process. Studies to date have focused on the unemployment impact of such policies, and overall, the effectiveness of such policies on unemployment has been mixed (OECD 2006). In the developing country context, results from randomized control trials likewise yielded mixed findings on the effectiveness of such policies on unemployment (McKenzie 2017).

A key issue that our setting highlights, but one which so far has received little attention, is that active labor market policies can impact the labor market via the employment and unemployment margina, in addition to the regular and contract employment margin. Indeed, the beneficiaries of job search assistance can include contract workers in search of regular employment opportunities on the job. Thus, what are the labor market and social welfare consequences of an improvement in the ability of contract workers to find regular employment?

In our model, this is captured by the parameter γ – the regularization deficit of contract work. Consider therefore an active labor market policy that decreases γ. In terms of task assignment, a reduction in γ decreases the reservation wage of contract work w_c from (8), since the opportunity cost of contract employment in terms of regular employment opportunities forgone decreases with a lower γ. It follows that wage polarization w_r/w_c is intensified. This increases the share of tasks performed by contract workers, and as such, the task assignment distortion relative to the first best is also increased.

In terms of total employment distortion, however, since a reduction in γ directly reduces the contract wage cost, the unit cost $c_y(w_r, w_c)$ likewise decreases, all else equal. It follows that the total employment distortion relative to the first best is mitigated in the presence of an active labor market policy that targets the regularization deficit of contract workers γ. Thus, with task assignment distortion rising and total output distortion decreasing as a consequence of active market policies that reduces γ, the overall welfare outcome is once again ambiguous.

Employment Protection Legislation

Employment protection legislation regulates the procedures that govern worker dismissals. In many countries, employment legislation spells out any restrictions on the firing of regular workers, and the associated costs in the form of severance payment, and / or legal fees and fines. In the case of India, for example, the Industrial Disputes Act of 1947, and subsequent amendments by individual states, describes the regulations related to layoffs and retrenchments. In establishments that employ at least 100 workers, no workers may be fired without the permission of the government. Furthermore, penalty for violating this regulation includes prison term as well as a fine. Contract workers are not covered under the Industrial Dispute Act.

To examine the impact of employment protection legislation, our model can be readily extended to endogenize the separation rate q, by allowing for unanticipated worker-specific productivity shocks that necessitate layoffs of regular workers, depending on the cost of dismissal. Consider therefore an employment protection legislation that raises the cost of dismissal. We demonstrate in the appendix that such a policy decreases the separation rate, q. This shifts the PP schedules to the left. Furthermore, from (15), a reduction in q also lowers the number of regular vacancies every period, all else equal. This shifts the EE schedule downwards. The combined impact of these changes tend to decrease n_r, and thus the efficiency wage also decreases from (6). Consequently, if labor market tightness is wage polarizing, firing costs have effects akin to a reduction in labor demand, and shift the location of the marginal task closer to the first best benchmark.

Going in opposite direction, however, since layoffs are costly in the presence of employment protection legislation, raising the cost of firing directly raises the cost of hiring regular workers. If this increase in cost dominates any efficiency and contract wage reductions as discussed above, an increase in firing cost will shift total production further away from the first best benchmark.

In summary, all three policies yield ambiguous social welfare implications in our setting where contract and regular workers coexists, and where worker discipline drives the two-tier structure of employment. The overall lesson is that the first best outcome requires not just that more jobs be created through an increase in the labor input y, but more good jobs should be created through a reduction in the share of contract tasks I. The policy implications of our findings thus juxtapose the need for both an improvement in quantity as well as quality of employment.

4 Conclusion

Does the practice of fixed term contract employment at low wages facilitate the maintenance of worker discipline otherwise secured by long term regular employment at efficiency wages? Will employers favor contract employment at low wages, or long-term employment at efficiency wages in response to rising demand for worker effort?

In this paper, we provide answers to these questions in the context of a two-tiered labor market where regular and contract workers co-exist. The model highlights the simultaneity of the share of contract workers and the extent of wage polarization in a labor market, in a setting where regular workers are given long-term employment at the incentive compatible efficiency wage, while contract workers receive acceptable wages. We show that while the practice of contract employment may lead to efficiency improvements relative to a regime in which such employment is banned by lowering the cost of maintaining worker discipline, the general equilibrium consequence of contract employment implies stark distributional tradeoffs that divorce the interests of employers and workers.

Notably, we find that in this two-tiered labor market, an increase in labor demand will further worsen wage polarization if contract employment does not present a significant barrier to workers hoping to search for regular employment on the job. In the Indian case, we find that evidence suggests that rising labor demand can in fact have adverse implications on wage polarization. The predictions of the model are consistent with decades of wage improvements in the Indian labor market due for example to forces of globalization, which coincided with an ever rising share of low wage contract workers instead of longer term regular workers at high wages.

Finally, we examine nature of the first best policies. We find that such policies correct for two types of distortions in the labor market, including task assignment distortions, and total employment distortions. We argue that the effectiveness of a suite of popularly used labor market flexibility policies (e.g. employment protection legislation, unemployment insurance, and active labor market policies) should be evaluated against the two types of distortions associated with contract employment identified here.

Reference

Acemoglu, Daron and Robert Shimer. 1999. "Efficient Unemployment Insurance," *Journal of Political Economy* 107 (5): 893-928.

Acemoglu, Daron and David Autor. 2011. "Skills, Tasks and Technologies: Implications for Employment and Earnings," Handbook of Labor Economics, volume 4. pp 1044 - 1171.

Autor, David. 2013. "The Task Approach to Labor Markets". *IZA Discussion Paper* No. 7178.

Ahsan, Ahmad, and Carmen Pag''es. 2007. "Are All Labor Regulations Equal? Assessing the Effects of Job Security, Labor Dispute and Contract Labor Laws in India," *World Bank Social Protection Discussion Paper* No. 0713.

Almeida, Rita and Pedro Carneiro. 2009. Enforcement of labor regulation and firm size.Journal of Comparative Economics 37: 2846

Basu, Arnab K., Nancy H. Chau and Ravi Kanbur. 2016. "Contractual Dualism, Market Power and Informality," *Economic Journal* 125: 15341573.

Belot, Michèle, Jan Boone, and Jan van Ours. 2007. "Welfare Improving Employment Protection. *Economica* 74: 381-396

Beaudry, Paul, David A. Green and Benjamin M. Sand. 2014. "In Search of Labor Demand," NBER Working Paper Series 20568.

Bhandari, Amit Kumar and Almas Heshmati. 2006. "Wage inequality and job insecurity among permanent and contract workers in India: evidence from organized manufacturing industries," IZA Discussion Paper 2097. April 2006.

Bentolila, Samuel, Juan J. Dilado, and Juan F. JimeNo. 2011. Reforming an Insider-Outsider Labor Market: The Spanish Experience. IZA Discussion Paper No. 6186. Bonn.

Besley, Timothy and Robin Burgess. 2004. Can Labor Regulation Hinder Economic Performance? Evidence from India. Quarterly Journal of Economics. 119 (1): 91-134.

Blanchard, Oliver and Augustin Landier. 2002. "The Perverse EFfects of Partial Labour Market Reform: Fixed-Term Contracts in France," *The Economic Journal* 112: F214-F244.

Blau, Francine, and Lawrence Kahn. 2016. "The Gender Pay Gap: Extent, Trends and Explanations." *IZA Discussion Paper* No. 9656.

Boeri, Tito. 2011. Institutional Reforms and Dualism in European Labor Markets. in Orley Ashenfelter and David Card (eds.). Handbook of Labor Economics. Vol. 4b. Amsterdam: North Holland. 1173-1236.

Cahuc, Pierre and Postel-Vinay, Fabien, 2002. "Temporary jobs, employment protection and labor market performance," Labour Economics, Elsevier, vol. 9(1), pages 63-91, February.

Card, David and Andrei Shleifer, 2009. "Immigration and Inequality," American Economic Review, American Economic Association, vol. 99(2), pages 1-21, May.

Cazes, Sandrine, and Juan Ramón de Laiglesia. 2015. "Temporary Contracts and Wage Inequality," In Janine Berg (ed.) *Labor Markets, Institutions and Inequality* ILO Geneva, Switzerland. pp. 147-183.

Chaurey, Ritam. 2015. "Labor Regularions and Contract Labor Use: Evidence from Indian Firms," *Journal of Development Economics* 114: 224232.

Chan, Man-Kwun. 2013. "Contract Labour in Global Garment Supply Chains," WIEGO publication.

Chau, Nancy H. 2016. "On Sweatshop Jobs and Decent Work," *Journal of Development Economics* 121: 120-134.

Doing Business. 2015. *Going Beyong Efficiency.* World Bank Group, Washington DC.

Eswaran, Mukesh and Ashok Kotwal. 1985. "A Theory of Two-Tier Labor Markets in Agrarian Economies," *American Economic Review* 75(1): 162-177.

Feenstra, Robert C. and Gordon H. Hansen. 2006. "Globalization, Outsourcing and Wage Inequality," *American Economic Review* 86(2): 240 - 245.

Grossman, Gene. M. and E. Rossi-Hansberg (2008) "Trading tasks: A simple theory of offshoring," *American Economic Review* 98(8): 1978-1997.

Gulati, Nikhil. 2012. "Indian Car Maker Declares Lockout," *The Wall Street Journal* 22 July 2012..

Harrison, Ann. 2006. *Globalization and Poverty.* University of Chicago Press.

Helpman, Elhanan, Oleg Itshoki and Stephen Redding. 2010. "Inequality and Unemployment in a Global Economy," *Econometrica* 78(4): 1239-1283.

Hopenhayn, Hugo and Richard Rogerson. 1993. Job Turnover and Policy Evaluation: A General Equilibrium Analysis. Journal of Political Economy. 101 (5): 915-938.

International Commission for Labor Rights. 2013. *Merchants of Menace: Repressing workers in Indias new industrial belt, Violations of workers and trade union rights at Maruti Suzuki India Ltd.*. New York.

International Labour Organization. 2012. *World of Work Report 2012: Better Jobs for a Better Economy.* Geneva: International Labour Organization and International Institute for Labour Studies.

International Labour Organization. 2015. *Report for a Tripartite Meeting of Experts on Non-standard Forms of Employment.* (Geneva, ILO).

Jones, Ronald and Henryk Kierzkowski. 1990. The role of services in production and international trade: A theoretical framework, in R. Jones and A. Krueger, The political economy of international trade: Festschrift in honor of Robert Baldwin, (Basil Blackwell, Oxford).

McKenzie, David. 2017. "How Effective Are Active Labor Market Policies in Developing Countries? A Critical Review of Recent Evidence," IZA Discussion Paper 10655.

OECD. 2004. Employment Outlook. Paris: OECD.

OECD. 2007. Employment Outlook. Paris: OECD.

Ramaswamy, K. V. 2013. "Size-Dependent Labour Regulations and Threshold Effects: The Case of Contract-worker Intensity in Indian Manufacturing," Indira Gandhi Institute of Development Research Working Paper 2013-012.

Shapiro, Carl and Joseph E. Stiglitz. 1984. " Equilibrium Unemployment as a Worker Discipline Device," *American Economic Review* 74 (3): 433-444.

Stiglitz, Joseph E. 1975. "Alternative Theories of Wage Determination and Unemployment in LDC's: The Labor Turnover Model," *Quarterly Journal of Economics* 88(2): 194-227.

Sapkal, Rahul Suresh. 2016. Labour law, enforcement and the rise of temporary contract workers: empirical evidence from Indias organised manufacturing sector," *European Journal of Political Economy* 42: 167-182.

Rajeev, Meenakshi. 2006. "Contract Labour in Karnataka: Emerging Issues and Options," *Economic and Political Weekly* May 27, 2006.

Ramaswamy, K. V. 2013. "Size-dependent Labour Regulations and Threshold Effects: The Case of Contract-worker Intensity in Indian manufacturing," Indira Gandhi Institute of Development Research, Mumbai Working Papers 2013-012, Indira Gandhi Institute of Development

Research, Mumbai, India.

Rogerson, Richard, Robert Shimer and Randall Wright, 2005. "Search-Theoretic Models of the Labor Market: A Survey." *Journal of Economic Literature* 43 (4): 959-988.

Rosen, Sherwin. 1986. "The Theory of Equalizing Differences." In Orley Ashenfelter and Richard Layard (eds.) *Handbook of Labor Economics* vol. I. Amsterdam: North Holland.

Smith, Adam. 1776. *An Inquiry into the Nature and Causes of the Wealth of Nations.* London: Methuen and Co., Ltd. Fifth edition.

Seghal, Rakhi. 2012. "Manesar Workers are the Villains': Truth or Prejudice?" *Economic and Political Weekly* Vol - XLVII No. 31, August 04, 2012.

Soundararajan, Vidhya. 2015. "Contract Work and Endogenous Firm Productivity in the Indian Manufacturing Sector." Working Paper.

Table 1: Number of countries with legal prohibitions on permanent tasks, and /or maximum duration on fixed term contracts (FTC). Source: Doing Business (2016).

	FTC Prohibited for Permanent Tasks	FTC Not Prohibited
Max. Duration on FTC	28	43
No Limit on Duration of FTC	42	78

Table 2: Summary of Statistics

Year: 1999-2004					
Variables	Obs	Mean	Std. Dev.	Min	Max
Share of Contract Workers (%)	2,319	0.267	0.213	0	1
Average Regular Wage (rupees per man day)	2,310	127.482	83.657	38.754	1820.341
Average Contract Wage (rupees per man day)	2,319	84.610	27.513	14.118	275.000
Contract Labor Intensity	2,310	0.767	3.0154	0	82.6
Wage Polarization (contract wage / regular wage)	2,310	0.729	0.184	0.078	0.999
Year: 2005-2011					
Variables	Obs	Mean	Std. Dev.	Min	Max
Share of Contract Workers (%)	3,208	0.377	0.239	0	1
Average Regular Wage (rupees per man day)	3,142	207.332	185.793	44.046	4829.13
Average Contract Wage (rupees per man day)	3,208	142.132	175.757	0.000	7945.804
Contract Labor Intensity	3,142	1.086	2.860	0.000	63.772
Wage Polarization (contract wage / regular wage)	3,142	0.745	0.187	0.000	0.999

Notes: 1. Contract Labor Intensity measures the ratio of contract to regular man days; 2. Data include all observations where regular wage is greater than contract wage to rule out contract employment in professions with specialized skills.

Table 3: Pooled Regular and Contract Wage Response to Labor Market Tightness as a Simple Average

	State and Industry Fixed Effects				Factory Fixed Effects			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Log Regular Wage	Log Contract Wage	Log Regular Wage	Log Contract Wage	Log Regular Wage	Log Contract Wage	Log Regular Wage	Log Contract Wage
Labor Market	0.202***	0.0790***	0.151***	0.0622***	0.0380***	0.0111*	0.0354***	0.0132**
Tightness	(0.00961)	(0.00641)	(0.00828)	(0.00618)	(0.0055)	(0.00607)	(0.0056)	(0.00625)
Constant	3.782***	3.959***	-22.73**	-39.46***	4.558***	4.345***	5.249	-21.92
	(0.0431)	(0.0289)	(10.93)	(10.24)	(0.0252)	(0.0275)	(10.36)	(13.44)
Factory FE	NO	NO	NO	NO	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
State-, Industry Time Trends and Controls	NO	NO	YES	YES	NO	NO	YES	YES
Number of factories					41,512	41,512	40,028	40,028
Observations	99,120	99,120	97,579	97,579	101,579	101,579	97,579	97,579
R-squared	0.411	0.405	0.523	0.433	0.414	0.346	0.421	0.351

Note: Robust standard errors clustered at the factory level in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; Firm level control variables include rural/urban dummy, firm size dummy, capital labor ratio, and dummies for type of organization. Industry FE is at the three-digit level; Industry time trend is at the two digit industry level. Labor market tightness is measured as log of average regular wage in all firms in the year-state-3-digit industry, except the current firm.

Table 4: Industry Specific Regular and Contract Wage Response to Labor Market Tightness Using Simple Average Independent Variable

	Food Products and Beverage		Textile		Chemical and Chemical Products		Other Non-Metallic Mineral Products		Basic Metals	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	Log Regular Wage	Log Contract Wage	Log Regular Wage	Log Contract Wage	Log Regular Wage	Log Contract Wage	Log Regular Wage	Log Contract Wage	Log Regular Wage	Log Contract Wage
Labor Market	0.192***	0.0740***	0.0428***	0.0257**	0.046	-0.0205	0.0477*	0.0461	0.0690*	-0.0019
Tightness	(0.0178)	(0.0138)	(0.013)	(0.0112)	(0.0299)	(0.0284)	(0.0245)	(0.0305)	(0.0369)	(0.0241)
Observations	24,225	24,225	7,436	7,436	10,733	10,733	7,635	7,635	7,304	7,304
R Squared	0.556	0.442	0.437	0.404	0.447	0.408	0.561	0.472	0.493	0.427

Note: Robust standard errors clustered at the factory level in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; State fixed effects, year fixed effects, state-time trend, as well as firm level controls are included in all specifications. Industry time trend is at the two digit industry level. Firm level control variables include rural/urban dummy, firm size dummy, capital labor ratio, and dummies for type of organization. Labor market tightness is measured as log of average regular wage in all firms in the year-state-3-digit industry, except the current firm.

Figure 1a
Kernel Density of Contract Manday Ratio 1999, 2009
(Contract Mandays to Total Mandays)

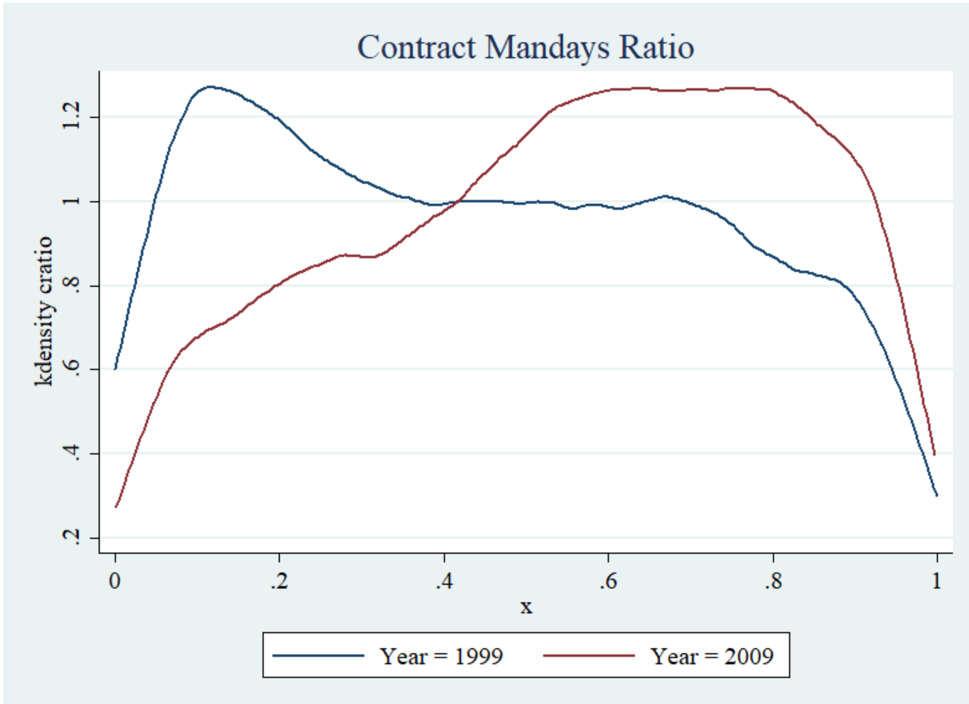


Figure 1b
Kernel Density of Regular and Contract Wages Per Manday
1999, 2009

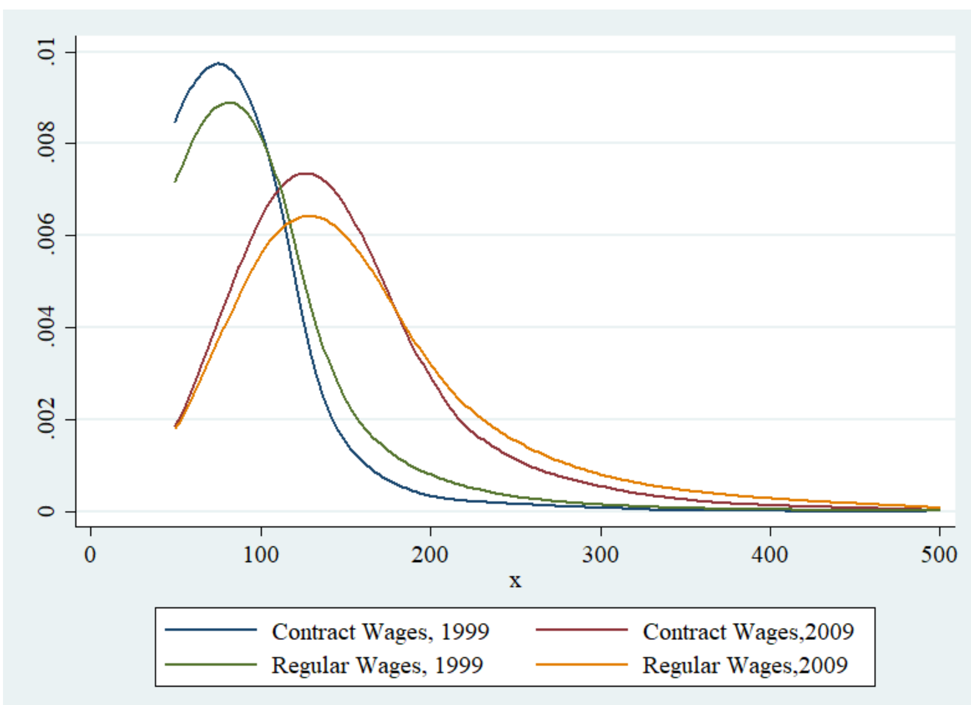


Figure 2
The PP Schedule

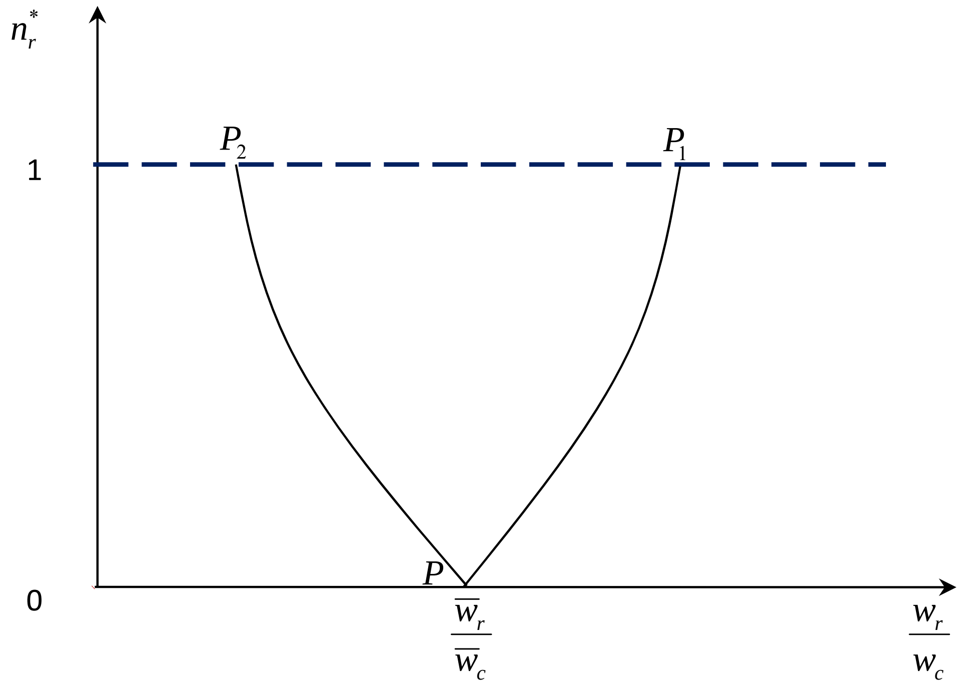
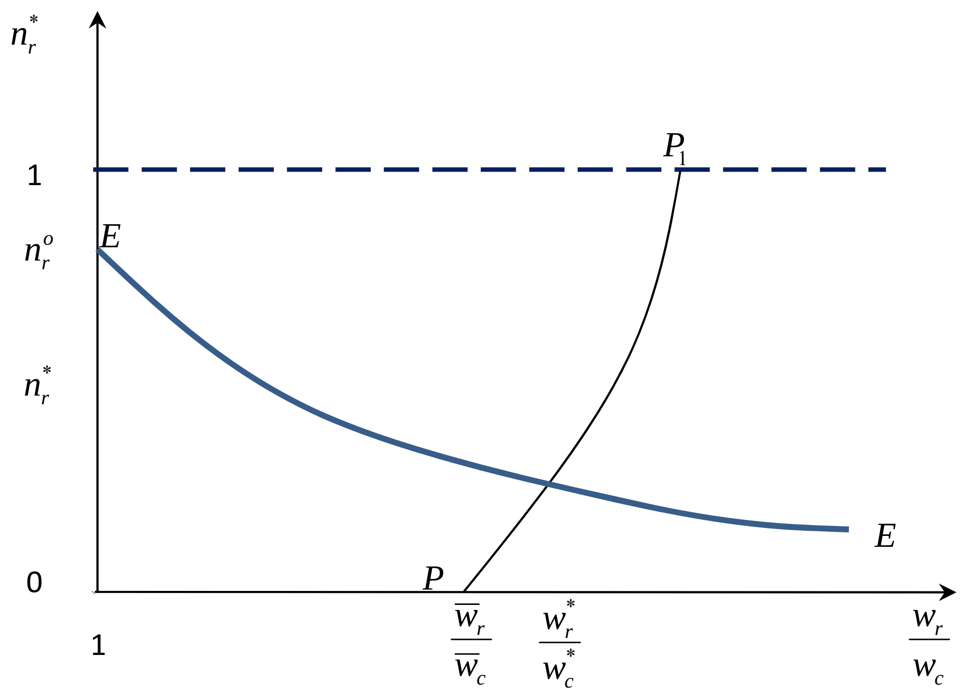


Figure 3
The EE and the Steady State Equilibrium



Appendix

In this appendix, we outline an extension of the model in which we incorporate endogenous separation rates and firing cost into the model. Formally, we endogenize the separation rate by introducing worker-specific and unanticipated productivity shocks: for each regular worker, a negative productivity shock occurs with probability q_o at the beginning of each time period. Otherwise, no productivity shocks occur.

Conditional on a negative shock, the firm faces two choices. First, the firm may fire the worker and hire a new regular worker, but in so doing it must also incur a fraction τ of the regular wage as firing cost, $w_r(n_r)\tau \geq 0$. τ parameterizes the strictness of employment protection legislation, and gives the penalty that a firm pays whenever a regular worker is dismissed.

Alternatively, the firm may choose to keep the worker and incur a cost to maintain productivity at planned level depending on the size of the productivity shock, σ. We assume that the cost of the productivity shock is proportional to wage cost $w_r(n_r)$. Specifically, the cost parameter $\sigma \in [0, \infty]$ is assumed to be a random variable with cumulative distribution function $\phi(\sigma)$. Since the cost of the productivity shock, $w_r(n_r)\sigma$, is increasing in σ, while the firing cost is given at $w_r(n_r)\tau$, henceforth, let σ^* denote the threshold cost of the productivity shock, to be determined endogenously in what follows, beyond which the firm strictly prefers firing the existing worker and hiring a new worker. Given σ^*, the realized separation rate q of a regular worker is

$$q = q_o(1 - \phi(\sigma^*)).$$

Accounting for the possibility of negative productivity shocks and firing costs, let $\omega_r(n_r, \sigma^*)$ denote the expected cost of hiring a regular worker. At any time period, $\omega_r(n_r, \sigma^*)$ solves the following recursive problem:

$$\begin{aligned} W_r(n_r, \sigma^*) &= (1 - q_o)w_r(n_r) + q_o(1 - \phi(\sigma^*))(W_r(n_r, \sigma^*) + w_r(n_r)\tau)) \\ &\quad + q_o \int_0^{\sigma^*} (w_r(n_r)(1 + \sigma))d\phi(\sigma) \qquad (18) \\ &= \frac{w_r(n_r)(1 + (q_o[(1 - \phi(\sigma^*))\tau + \int_0^{\sigma^*} \sigma d\phi(\sigma)]}{1 - q_o(1 - \phi(\sigma^*))}. \qquad (19) \end{aligned}$$

Thus, the expected cost of hiring a regular worker includes both the wage cost, the cost associated with negative productivity shocks when these shocks are sufficiently low, as well as the first cost when the productivity shocks are large enough.

Taken together the unit cost of task i is simply:

$$W_r(n_r, \sigma^*)\ell_r(i) + w_c\ell_c(i).$$

The decision problem of the firm is accordingly revised to include the choice of σ^*, I^*, and y^* to maximize profits. Starting with σ^*, it follows that the expected regular wage cost minimizing threshold x^* solves the following:

$$\sigma^* = \left(T + q_o(e_r - e_o)/\sigma\right)/(1 - q_o\psi(x^*)). \tag{20}$$

where $\psi(\sigma^*) \equiv 1 - \int_0^{\sigma^*}(\sigma^* - \sigma)/\sigma^* d\phi(\sigma) \in (0, 1)$. Intuitively, T is the firing cost savings when the firm delays firing work by raising $\phi(\sigma^*)$, while $q_o(e_r - e_o)/\sigma$ is the associated savings in efficiency wage as turnover rate declines. Meanwhile, the cost of a delay in firing workers by raising $\phi(\sigma^*)$ is equal to

$$\sigma^*(1 - q_o\phi(\sigma^*)).$$

Note that this is strictly less than σ^*, since the minimization problem factors in the fact that raising σ^* also lowers the probability of firing subsequent replacement workers if negative productivity shocks once again occur.

Since the right hand side of (20) is monotonically decreasing in σ^*, it is straightforward to confirm that a unique solution to (20) exists, and that the solution σ^* is a monotonically increasing function of the firing cost τ. Quite intuitively, as the government raises the cost of firing, firms adjust downward the turnover rate $q = q_o(1 - \phi(\sigma^*))$. Naturally, W_r is strictly increase in τ, meaning that the cost of hiring a regular worker is strictly increasing in the cost of firing.

Thus, even in the absence of a government imposed firing cost $\tau = 0$, employers do not automatically fire workers whenever a negative shock occurs, for

$$q = q_o(1 - \phi(\sigma^*)).$$

Interestingly, the separation rate is linked to the parameters of the efficiency wage in a intuitive way. Specifically, the increase in the efficiency wage required to elicit effort when q rises is proportional to the ratio $(e_r - e_o)/\sigma$. The higher the ratio of unobservable effort to the likelihood of discovery a shirking worker, the more salient efficiency wage considerations are. Consequently, employers minimize cost by showing a willingness to tolerate more negative productivity shocks, and thus a lower separation rate.

Table A.1: Pooled Regular and Contract Wage Response to Labor Market Tightness as a Mandays Weighted Average

	State and Industry Fixed Effects				Factory Fixed Effects			
VARIABLES	(1) Log Regular Wage	(2) Log Contract Wage	(3) Log Regular Wage	(4) Log Contract Wage	(5) Log Regular Wage	(6) Log Contract Wage	(7) Log Regular Wage	(8) Log Contract Wage
Labor Market	0.186***	0.0812***	0.141***	0.0622***	0.0439***	0.0117*	0.0339***	0.00208
Tightness	(0.00823)	(0.00554)	(0.0071)	(0.00537)	(0.00623)	(0.00667)	(0.00642)	(0.00698)
Constant	3.756***	3.909***	-21.10*	-38.80***	4.502***	4.333***	5.977	-21.63
	(0.0415)	(0.0281)	(11.06)	(10.34)	(0.0326)	(0.0348)	(10.49)	(13.45)
Factory FE	NO	NO	NO	NO	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
State-, Industry Time Trends and Controls	NO	NO	YES	YES	NO	NO	YES	YES
Number of factories					41,512	41,512	40,028	40,028
Observations	99,052	99,052	97,511	97,511	101,511	101,511	97,511	97,511
R-squared	0.412	0.406	0.524	0.434	0.414	0.346	0.421	0.352

Note: Robust standard errors clustered at the factory level in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; Firm level control variables include rural/urban dummy, firm size dummy, capital labor ratio, and dummies for type of organization. Industry FE is at the three-digit level; Industry time trend is at the two digit industry level. Labor market tightness is measured as log of mandays weighted average regular wage in all firms in the year-state-3-digit industry, except the current firm.

Table A.2: Industry Specific Regular and Contract Wage Response to Labor Market Tightness Using Mandays Weighted Average Independent Variable

	Food Products and Beverage		Textile		Chemical and Chemical Products		Other Non-Metallic Mineral Products		Basic Metals	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	Log Regular Wage	Log Contract Wage	Log Regular Wage	Log Contract Wage	Log Regular Wage	Log Contract Wage	Log Regular Wage	Log Contract Wage	Log Regular Wage	Log Contract Wage
Labor Market	0.235***	0.0887***	0.139***	0.105***	0.0336	-0.0366	0.0424*	0.0405*	0.0424*	0.0405*
Tightness	(0.0158)	(0.0127)	(0.0382)	(0.033)	(0.0362)	(0.0251)	(0.0243)	(0.0232)	(0.0243)	(0.0232)
Observations	24,217	24,217	7,433	7,433	10,728	10,728	7,635	7,635	7,302	7,302
R Squared	0.556	0.444	0.438	0.405	0.447	0.408	0.561	0.472	0.493	0.427

Note: Robust standard errors clustered at the factory level in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; State fixed effects, year fixed effects, state-time trend, as well as firm level controls are included in all specifications. Industry time trend is at the two digit industry level. Firm level control variables include rural/urban dummy, firm size dummy, capital labor ratio, and dummies for type of organization. Labor market tightness is measured as log of mandays weighted average regular wage in all firms in the year-state-3-digit industry, except the current firm.