Selective Counteroffers

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The existence of counteroffers can lead to a variety of important labor-market features. This article develops a model of the selective use of counteroffers in which a firm decides whether to extend counteroffers after a worker informs the firm of an alternative offer. We outline factors that can influence the employer's net value of making a counteroffer and, thus, affect the likelihood of a counteroffer. We provide a new empirical analysis that examines whether proxies for these factors do, in fact, influence the likelihood that a firm would consider a counteroffer to an employee with a competing offer.

I. Introduction

While counteroffers are common in the academic labor market, little is known about how frequently they occur in the economy as a whole. In this article, we outline conditions for the selective use of counteroffers and provide new evidence indicating that the likelihood that a firm extends a counteroffer to a particular employee with a competing offer is predictable and depends on factors suggested by the theory developed.

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To our knowledge, Mortensen's (1978) seminal paper was the first to consider formally the implications of matching offers to retain workers engaged in on-the-job search. In Mortensen's model, there is a match-specific rent to each employment match that is divided between the worker and the firm. Workers and firms then search for better matches; efficiency requires that each party, when making turnover decisions, consider the total match-specific rent, not just the share of the rent that accrues to them. In this setting, if a firm counters alternative wage offers received by a worker with a wage offer equal to the minimum of either the alternative wage offer or the wage that reduces the firm's rents to zero, then the worker's turnover decision will be efficient. Such a "matching-offer" policy, however, will induce the worker to engage in too much search, as the worker does not consider the cost imposed on the firm if the alternative offer is preferred and the worker quits. This inefficiency, Mortensen shows, may be eliminated by the use of bonds that are forfeited when an employee initiates the turnover.

A number of papers have explored other implications of the combination of outside wage offers and a matching-offer policy considered by Mortensen. For instance, Greenwald (1986) identifies the adverse selection that arises in the hiring of workers from the employed ranks if a worker's current employer is informed regarding a worker's productivity, but competing firms are not, and the firm adopts a policy of matching offers. Such adverse selection inhibits workers from entering the secondary labor market and, thus, the mobility of employed workers.[1] In contrast, Lazear (1986) presumes that both the current and the alternative employer face the same likelihood of being informed regarding the worker's productivity. Lazear then demonstrates the potential for adverse selection with respect to workers who do not receive outside offers.[2] Specifically, raids are selective, and the current employer infers that a worker who does not receive outside wage offers is more likely to have productivity below the worker's wage. Postel-Vinay and Robin (2002a, 2002b) modify the wage-posting model of Burdett and Mortensen (1998) to allow a matching-offer policy by firms and to demonstrate how this alters the equilibrium

[1] Perri (1995) considers the potential for counteroffers to lead to a "winner's curse" for the raiding firm and then shows how the reassignment of workers by firms in anticipation of being raided can lessen or eliminate this winner's curse effect.

[2] In Lazear's (1986) model, outside wage offers are only made if the alternative employer is informed and the worker's productivity exceeds the worker's wage. The employing firm then either matches the offer if the worker's productivity is unknown or counters with a wage equal to the known productivity of the worker to the firm, which includes a firm-specific component. The raiding firm is successful in those cases when this firm-specific component is negative. One result is that job leavers have, on average, higher general productivity than stayers.

wage distribution in a general equilibrium job search model with on-the-job search.

While the literature has recognized that the existence of a matching-offer policy can lead to a variety of important insights for labor markets, less attention has been placed on understanding when counteroffers may or may not be used. An important exception is the recent paper by Postel-Vinay and Robin (2004). This paper considers a labor-market equilibrium in which two types of firms coexist: firms that commit to a offer-matching policy and firms that commit to a policy of never making counteroffers. The benefit of the former policy is that by matching alternative wage offers, the firm can retain workers who still provide rents. The advantage of the latter policy is that the firm eliminates the incentive for a worker to search and, thus, reduces the rate at which the worker obtains alternative wage offers, as competing firms need only offer an epsilon above the worker's current wage to induce the worker to switch.

Our approach has much in common with Postel-Vinay and Robin (2004) but differs from their analysis in three important ways. First, we introduce private information on reservation values.[3] If a worker's value to continued employment is private, then firms no longer perceive circumstances under which an epsilon increase in the size of the counteroffer leads to a discontinuous jump from zero to one in the probability that the worker remains at the firm. If a firm's value to continued employment is private, then this opens the potential for workers to update their perception of the firm's counteroffer policy based on the actual behavior of the firm. Second, we assume that a firm is not able credibly to commit to either a no-counteroffer policy or a matching-offer policy. Rather, counteroffer decisions are made on a case-by-case basis. We refer to this as a "selective" counteroffer policy. One important result is that workers' perception of a firm's counteroffer policy is updated based on the actual responses of the firm to workers who receive alternative wage offers. Third, we introduce a continuous search intensity choice on the part of employed workers, such that any change in a worker's perception of the firm's counteroffer policy can alter the worker's search intensity and, thus, the likelihood of future alternative wage offers and the capital value of the worker to the firm.

In Section II of this article, we introduce the framework for a theory

[3] Barron, Black, and Loewenstein (1993) considered models in which the worker's valuation of the employment offer varies idiosyncratically, and, while the distribution of the valuation is common knowledge between the firm and worker, the exact realization of the value of the employment match remains the private information of the firm. Black (1995) considers the use of a similar model to consider discrimination against minority workers. Black and Loewenstein (1991) consider models in which the mobility cost of a worker is both common knowledge and the private information of the worker.

of counteroffers that incorporates these three assumptions. Section III provides an empirical test of the theory. The data are drawn from a new data source: the 2001 Small Business Administration Survey. The survey provides specific information on the last worker hired by the firm, including whether the firm would consider extending a counteroffer to the worker. We use the theory developed in Section II as a guide to identifying variables in the data set that can affect the probability of a counteroffer. In doing so, we isolate the importance of endogenous search and coworkers to explain a pattern of selective counteroffers. Our empirical analysis reveals a pattern of selective counteroffers consistent with the predictions of the theory. Section IV provides concluding remarks.

II. A Theory of Counteroffers

Consider a match of a firm and a worker. Let mh denote the firm's realized joint value of the match, or "marginal product," of the worker in the position over the short time interval of length h, with m drawn from the continuous distribution $K(m)$, with upper and lower bounds $\bar{m}$ and $\underline{m}$, respectively, and mean μ_m. The division of this joint value between the worker and the firm is determined by the wage rate w and the residual net match value flow to the firm, $m - w$. The realized rent flow that accrues to the firm, $m - w$, is private information to the firm. Further, it is assumed that the match value distribution varies across employers and that a newly hired worker does not know the mean for his or her current employer. We rely on this asymmetric information as one reason why workers update their perception of the counteroffer policy of their current employer based on the employer's counteroffer choices, as such choices by the employer are influenced by match values.

For the worker, let $w + \alpha$ be the utility flow value of match, where α denotes the match's idiosyncratic nonpecuniary benefits flow to the worker. It is assumed that α is drawn from the distribution $G(\alpha)$ with mean zero and density function $g(\alpha)$. In general, α is private information to the worker and is only discovered by the worker after accepting the position.[4] We later rely on this asymmetric information as one reason employers cannot identify a particular counteroffer that will assure a worker's retention.

A. Worker Optimal Search Intensity

Workers engage in on-the-job searches that generate alternative wage offers. If search during the period does not generate a wage offer, then we assume that the wages the firms pay workers in the next period remain

[4] Lippman and McCall's (1981) analysis of on-the-job search relies on such an assumption of "belated information," namely, that there are nonpecuniary benefits that can only be determined once a job offer is accepted and work begins.

the same as in the current period.[5] Let $\lambda(s)h$ denote the probability over the small time interval h that workers with on-the-job search intensity rate s generate alternative wage offers drawn from the distribution $F(\hat{w})$.[6] There are positive, but diminishing, returns to search intensity, such that $\partial\lambda(s)/\partial s > 0$ and $\partial\lambda^2(s)/\partial s^2 < 0$. We assume that $F(\hat{w})$ is a stationary distribution with upper and lower bounds $\bar{\hat{w}}$ and $\underline{\hat{w}}$, respectively. The workers' on-the-job search cost over the interval h is denoted by $c(s)h$, with $\partial c(s)/\partial s > 0$ and $\partial^2 c(s)/\partial s^2 > 0$.

We assume that the worker presents all alternative wage offers to the firm so that the probability a worker brings an alternative wage offer to the employer over the time interval h is simply $\lambda(s)h$. The firm's response to an alternative wage offer $\hat{w}$ is an increase in the current wage defined by Δw^c.[7] We assume that any counteroffer by the firm is not less than w, such that $\Delta w^c \geq 0$. As the worker is not privy to some of the factors that determine the optimal counteroffer, such as the rent that accrues to the firm from a particular match, this response is viewed by the worker as a random variable. Let $H(\Delta w^c, \hat{w})$ define the worker's perception of the joint distribution of counteroffer increments and alternative wage offers. The conditional distribution $J(\Delta w^c | \hat{w})$ summarizes the worker's perception of the firm's counteroffer policy for a particular realized alternative wage offer $\hat{w}$.

We restrict a worker's beliefs regarding the firm's counteroffer policy, summarized by $H(\Delta w^c, \hat{w})$, to be updated based only on the firm's response to alternative wage offers, whether the response is to the worker or to other employees at the firm who receive alternative wage offers. Thus, the worker anticipates systematic differences in counteroffer policies across firms and positions but is not fully informed regarding these differences. One factor that both affects the firm's counteroffer response and is difficult for the worker to know precisely is the flow net value of the match to the firm, $m - w$.

[5] This need not be the case, as the absence of an alternative wage offer could alter the firm's view of the worker's likelihood of leaving and thus the optimal wage. In particular, given that the worker's nonpecuniary benefits from the position are unknown to the firm, the absence of a counteroffer can lead the firm to update its perception of such benefits.

[6] We have in mind a Poisson process for the arrival of alternative wage offers, such that the likelihood of more than one offer over the short time interval h is negligible and is thus ignored.

[7] For simplicity, we assume that firms' wage offers, including firms' counteroffers, are in the form of simple take-it-or-leave-it offers. Postel-Vinay and Robin (2002b) make a similar assumption of take-it-or-leave-it counteroffers.

If the worker is the only employee, the value function for this single worker is given by:

$$V^w(w+\alpha, H) = \max_s [w+\alpha-c(s)]h + \beta(h) \{[1-\lambda(s)h]\, V^w(w+\alpha, H) + \lambda(s)h\, R^w\}, \quad (1)$$

where $\beta(h)$ is the discount factor and R^w is the expected return to the worker of generating an alternative wage offer. Let H' denote the worker's updated joint distribution of counteroffer wage increments and alternative wages given the reaction of the firm to the worker's outside wage offer. Then R^w is given by:

$$R^w = \int_{\underline{\hat{w}}}^{\bar{\hat{w}}} \int_{0}^{\Delta\bar{w}^c} \max [V^w(w+\Delta w^c+\alpha, H'), \int_{\underline{\alpha}}^{\bar{\alpha}} V^w(\hat{w}+\alpha, \hat{H})\, dG(\alpha)] dJ(\Delta w^c|\hat{w})\, dF(\hat{w}), \quad (2)$$

where $\hat{H}$ denotes the prior regarding the counteroffer policy of the firm making the alternative wage offer. Expression R^w summarizes the expected return of an alternative wage offer given that the worker chooses optimally between accepting the alternative position with wage rate $\hat{w}$ and unknown nonpecuniary benefit or remaining at the current employer with new wage rate $w+\Delta w^c$, nonpecuniary benefit flow α, and perceived updated counteroffer joint distribution H'.[8]

The worker's optimal choice of the search intensity rate satisfies:[9]

$$\partial c(s)/\partial s = \beta(h)\,(\partial\lambda/\partial s)[R^w - V^w(w+\alpha, H)]\,. \quad (3)$$

From equation (3), the optimal rate of search intensity for the worker depends on, among other things, the realized idiosyncratic nonpecuniary flow value of the current match to the worker, α; the wage rate if the worker remains with the firm, w; the perceived counteroffer policy of the firm for each alternative wage rate offer, $J(\Delta w^c|\hat{w})$; and the distribution of alternative wage offers, $F(\hat{w})$. The latter two influence search intensity

[8] In the discussion to follow, we do not focus on the potential gains to search that could accrue from the facts that an alternative wage offer allows the worker to obtain additional information regarding the firm's counteroffer policy and that such an updating of H can improve the worker's decision making with regard to the optimal search intensity.

[9] We assume an interior solution for search intensity.

through their effect on the expected return to generating an alternative wage offer, R^w.

If there is a coworker, and we assume independence of arrival rates for alternative wage offers, then over the small time interval h the worker receives a wage offer, the worker's coworker receives a wage offer, or neither receives a wage offer. Using the subscripts a and b to denote the specific wage, nonpecuniary benefits, search intensity, and counteroffer beliefs of the two workers, the value function for worker a when there is a second worker b becomes:

$$\begin{aligned} V_a^w(w_a + \alpha_a, H_a) = \max_{s_a} [w_a + \alpha_a - c(s_a)]h + \beta(h) \\ \{[1 - \lambda(s_a) - \lambda(s_b)h]\, V_a^w(w_a + \alpha_a, H_a) \\ + \lambda(s_a)h\, R_a^w + \lambda(s_b)h\, V_a^w(w_a + \alpha_a, H_a'')\}, \end{aligned} \tag{4}$$

where s_b denotes the search intensity rate of the coworker and H_a'' denotes the worker's updated joint distribution of counteroffer wage increments and alternative wage offers given the reaction of the firm to a wage offer received by the worker's coworker. To simplify our analysis, worker a only considers the impact on H_a of the other worker's search and counteroffer outcomes. Given this assumption, R_a^w is defined in a fashion similar to equation (2).

B. Firm Optimal Counteroffer Policy

Consider a firm that employs a single worker in a position with net flow match value $m - w$. Let the firm's perception of the search intensity of the worker be summarized by the distribution function $L(s)$ with upper and lower bounds $\bar{s}$ and $\underline{s}$. Let s^e denote the firm's point estimate of the worker's search intensity that matches the probability that the worker locates an outside job. That is, given that $\lambda(s)h$ denotes the probability over the small time interval h that a worker with on-the-job search intensity rate s obtains an outside offer, then s^e is defined by:

$$\lambda(s^e)h = \int_{\underline{s}}^{\bar{s}} \lambda(s)h\, dL(s).$$

Each period, the firm updates its perception of the worker's search in-

tensity s^e based on whether or not the worker presents an outside offer.[10] Then, the firm has the following value function for the worker:

$$V^f(m, w, s^e) = (m - w)h + \beta(h)\{[1 - \lambda(s^e)h]V^f (m, w, s^{e\prime}) + \lambda(s^e)hR^f\}, \quad (5)$$

where $s^{e\prime}$ is the firm's updated perception of the worker's search intensity if the worker presents no outside offer and R^f is the expected return to the firm given that the worker has received an alternative wage offer $\hat{w}$ and the firm follows its optimal counteroffer policy. This expected return to the firm is given by:

$$R^f = \int_{\underline{\hat{w}}}^{\bar{w}} \max_{\Delta w^c} \gamma(\hat{w}, w + \Delta w^c, s^{e\prime\prime})\, V^{f\prime}(m, w + \Delta w^c, s^{e\prime\prime}) + [1 - \gamma(\hat{w}, w + \Delta w^c, s^{e\prime\prime})]\, V^o\, dF(\hat{w}), \quad (6)$$

with $m - w \geq \Delta w^c \geq 0$. The term $s^{e\prime\prime}$ is the firm's updated perception of the worker's search intensity given that the worker has presented an outside offer. The term $\gamma(\hat{w}, w + \Delta w^c, s^{e\prime\prime})$ denotes the perceived probability that the worker rejects the outside offer and remains with the firm, and $V^o \geq 0$ is the expected value if the worker quits. We presume that $\partial\gamma(\hat{w}, w + \Delta w^c, s^{e\prime\prime})/\partial\Delta w^c > 0$, such that an increase in the counteroffer increases the probability that the worker remains with the firm. If the worker quits, this typically means that the firm returns to the labor market to search for a replacement worker.

In examining equations (5) and (6), there are several key factors that determine the firm's optimal counteroffer policy. First, given that $V^o < V^{f\prime}$, the firm benefits from a reduction in the likelihood that the worker accepts an alternative wage offer. This provides a gain to an increase in the counteroffer to the extent that it reduces the worker's likelihood of quitting. Offsetting this is the fact that $\partial V^{f\prime}/\partial\Delta w^c < 0$, as a higher counteroffer reduces the capital value of the position by reducing the flow net match value.[11] The firm's belief regarding the sign of $\partial s^{e\prime\prime}/\partial\Delta w^c$ is unclear. On the one hand, an increase in the counteroffer, by raising the wage the worker receives, will reduce the worker's incentive to search in the future, other things equal. On the other hand, an increase in the counteroffer can result in the worker anticipating a more favorable response by the

[10] Recall that we have simplified the analysis by abstracting from a second potential element of the firm's problem, namely, the optimal adjustment in wage in the absence of an alternative wage offer.

[11] This statement takes as given the future search intensity proclivities of the worker.

firm to future outside offers and, thus, encourage increased search intensity.

The firm's problem highlights an interesting feature of the analysis from which we have abstracted. Clearly, the firm's capital value of the worker depends in part on the firm's perception of the worker's search intensity. In this regard, a change in the firm's perception could affect not only the current counteroffer but also subsequent counteroffers. The worker may find it optimal to not reveal some alternative wage offers, in particular ones that the worker would never accept, if doing so increases the firm's perception of the worker's search intensity.[12] For simplicity, we ignore such strategic behavior by the worker.

With a second coworker, if we assume that the returns to the two workers are additively separable, then the firm's value function given the two coworkers a and b becomes:

$$\begin{aligned} V^f &= V_a^f(m_a, w_a, s_a^e) + V_b^f(m_a, w_a, s_a^e) \\ &= (m_a + m_b - w_a - w_b)h \\ &\quad + \beta(h)\{[1 - \lambda(s_a^e)h - \lambda(s_b^e)h]V^{f\prime} \\ &\quad + \lambda(s_a^e)hR_a^f + \lambda(s_b^e)hR_b^f\}, \end{aligned} \tag{7}$$

where the expected return if coworker a obtains an alternative wage offer, R_a^f, is given by:

$$\begin{aligned} R_a^f = \int_{\underline{\hat{w}}}^{\bar{\hat{w}}} & \max_{\Delta w_a^c} \gamma(\hat{w}, w_a + \Delta w_a^c, s_a^{e\prime\prime})\,[V_a^{f\prime}(m_a, w_a + \Delta w_a^c, s_a^{e\prime\prime})] \\ & + [1 - \gamma(\hat{w}, w_a + \Delta w_a^c, s_a^{e\prime\prime})](\,V^o) \\ & + V_b^{f\prime\prime}(m_b, w_b, s_b^{e\prime\prime})\,dF(\hat{w}). \end{aligned} \tag{8}$$

A similar expression defines the expected return if coworker b obtains an alternative wage offer, R_b^f.

In examining equations (7) and (8), an important new consideration arises with respect to the firm's optimal counteroffer policy. In particular, the firm must now be concerned not only with the effect of a positive counteroffer on the future search intensity of the worker receiving the offer but also on the future search intensity of the coworker. The result is that the potential gains to a positive counteroffer to worker a are likely reduced not only to the extent that such a counteroffer is perceived by

[12] This is one way that not only captures formally the value firms place on "loyalty" but also suggests why firms might react negatively to a worker whose loyalty comes under question.

the firm to increase worker a's future search intensity (such that $s_a^{e\prime\prime} > s_a^e$) but also to the extent that such a counteroffer is perceived by the firm to increase the search intensity of coworker b (such that $s_b^{e\prime\prime} > s_b^e$).

C. The Counteroffer Choice: Alternative Approaches

In 2001, the Small Business Administration (SBA) funded a survey of employers. Section III below provides details regarding the survey. For our purposes, there are two key questions that the survey asked to firms with a current employee who had been hired within the prior 2 years. These two questions are: "Suppose (the new hire) received a job offer from another company. Would you consider raising (the new hire's) wage in order to retain (this person) as an employee?" If the firm answered "yes," the firm was then asked the follow-up question: "What is the maximum percentage increase in (the new hire's) wage that you would be willing to pay to retain (this person) as an employee?" In table 1, we report the responses for workers hired within 2 years of the survey. For 41.3% of these workers, the firm would consider a counteroffer. For 52.5% of the workers, the firm would not consider a counteroffer. We also provide characteristics of the firms and positions in the sample by the response to the counteroffer question. The frequencies of responses are similar across industry. There are, however, differences in such firm characteristics as the union status of the position and the size of the firm. Our subsequent analysis will explore how these as well as other differences related to the firm and the specific new hire might affect the likelihood of a counteroffer. The magnitudes of potential counteroffers are quite large; for those who could consider a counteroffer, the median of the maximum increase equals 10%.

Of course, there is no definitive way to identify from these data whether the observed likelihood in a counteroffer reflects variation in counteroffer policy—with some firms announcing a policy of matching counteroffers and other firms announcing a binding commitment to make no counteroffers—or reflects selective counteroffers. In the Postel-Vinay and Robin (2004, 297) model, the equilibrium is a "dual labor market" populated by both nonmatching firms that have "bad jobs at low-productivity" and matching firms that have "good jobs at high-productivity." In our data, however, we find virtually no correlation between the likelihood of a counteroffer at a particular firm and the worker's starting wage ($\rho = 0.032$). Further, our subsequent empirical analysis indicates that the likelihood of a counteroffer depends on characteristics unique to the job and to the specific matches between a worker and a firm, suggesting that firms adopt a "selective" counteroffer policy.

With this in mind, we review below the implications for selective counteroffers of different assumptions regarding common knowledge and the

search behavior of employed workers. It should be clear, however, that there remains the potential for the responses cited above to reflect, at least in some instances, the ability and desire of some firms to adopt a credible commitment to a no-counteroffer policy. In such cases, our analysis of selective counteroffers still has value, as the factors that influence the value of selective counteroffers also influence the cost to the firm of adopting a general no-counteroffer policy. What our analysis does not address by focusing on selective counteroffers is a full discussion of the factors that could affect the ability of the firm to commit to a counteroffer policy.

Case When Worker Match Value Is Known and Search Intensity Is Exogenous

Consider the case when firms know the nonpecuniary benefits of individual workers and employed workers have fixed search intensity. In such a case, the optimal counteroffer policy is the matching mechanism suggested by Mortensen (1978) and adopted by Postel-Vinay and Robin (2004) as one of two counteroffer policies that a firm could adopt. In the context of our prior discussion, a worker with an alternative wage offer will leave the firm unless the counteroffer is such that $V^w(w + \Delta w^c + \alpha, H') \geq E_\alpha[V^w(\hat{w} + \alpha, H^o)]$. Given exogenous search intensity, search intensity in the future is independent of the realized nonpecuniary benefit at a new position, and we can restate this condition for remaining at the employer as $w + \Delta w^c + \alpha \geq \hat{w}$.

If $w + \alpha \geq \hat{w}$, then the firm can retain the worker with no counteroffer, and $\Delta w^c = 0$. No counteroffer will also occur if the counteroffer required to retain the worker is $\Delta w^c > m - w$, such that the firm incurs losses with such a counteroffer. Assuming that the return to the firm if the worker leaves is zero ($V^o = 0$), the optimal counteroffer policy can thus be stated as:

$$\begin{aligned} &\Delta w^c = 0 \text{ if } w + \alpha \geq \hat{w} \\ &\Delta w^c = \min(\hat{w} - w - \alpha, m - w) \text{ if } m + \alpha > \hat{w} > w + \alpha \\ &\Delta w^c = 0 \text{ if } \hat{w} \geq m + \alpha. \end{aligned} \tag{9}$$

In this setting, for alternative wage offers that satisfy $m + \alpha > \hat{w} > w + \alpha$, all employers would make a counteroffer ($\Delta w^c > 0$). Such alternative wage offers exist given $m > w$, suggesting that an employer would consider counteroffers for all of its workers. Yet, we find that fewer than half the employers in our sample would consider a counteroffer for a particular worker.

Of course, one way to eliminate the consideration of a counteroffer is to relax the condition that $m > w$ for all employees. For instance, assume that the realized value of the match m is revealed to the employer only

Table 1
Responses to Counteroffer Questions for Recent Hires in 2001 SBA Data

	Percent Who Would Consider a Counteroffer	Percent Who Would Not Consider a Counteroffer	Percent Unsure regarding Counteroffer	Percent Who Refused to Answer regarding Counteroffer	No. of Observations
Industry of employer:					
Mining/agriculture	66.7	33.3	.0	.0	6
Construction	36.8	36.8	21.1	5.3	19
Manufacturing	37.6	55.4	5.9	1.0	101
Transportation, etc.	17.9	71.4	10.7	.0	28
Wholesale	50.4	42.6	5.4	1.6	129
Retail	53.4	40.9	4.5	1.1	88
Finance, etc.	42.1	52.6	5.3	.0	38
Services	38.3	56.8	4.9	.0	345
Other	38.5	57.7	3.8	.0	78
Percent overall	41.3	52.5	5.5	.6	
No. of observations	344	437	46	5	832

	Counteroffer Response				
	Would Consider a Counteroffer	Would Not Consider a Counteroffer	Unsure regarding Counteroffer	Refused to Answer regarding Counteroffer	
Employer/position/worker characteristics:					
Establishment size (in thousands)	1.35	2.02	1.71	4.15	832
Union position (%)	3.2	16.5	8.7	.0	832
Age of new hire (no. of years)	30.4	32.4	33.6	23.4	796
Education of new hire (no. of years)	13.4	13.2	14.1	12.2	799
	Median % Increase	No. of Observations			
For those who would consider a counteroffer:					
Maximum percent increase of counteroffer (average) among those who would make counteroffer and no. of observations	10.0	300			
Percent unsure or refused to answer question regarding maximum percent increase of counteroffer and no. of observations	NA	44			

SOURCE.—2001 U.S. Small Business Administration (SBA) Survey.
NOTE.—Recent hires are individuals hired within 2 years of the survey date. Worker and employer characteristics are calculated only for observations with valid responses.

after the worker is hired and there are dismissal costs. Then there could be some workers for whom $m < w$, yet the firm continues their employment to avoid dismissal costs. In this case, employers would welcome alternative offers and clearly not counteroffer to increase the likelihood that the worker accepts the alternative wage offer. In our sample, however, we have a significant number of firms that would not consider a counteroffer offer even for a worker they identify as having above-average skills, so the combination of belated information on match value and firing costs appears not sufficient to fully explain selective counteroffers.

Case When Worker Match Value Is Private Knowledge and Search Intensity Is Exogenous

Now consider the case when the worker's value of the match and, in particular, the value to the worker of the nonpecuniary benefits, α, is unknown to the firm. Given exogenous search intensity, a worker will quit the firm if $\alpha < \hat{w} - w$. Given that the firm only knows the distribution of α, $G(\alpha)$, we thus have the probability that the worker stays with the firm given by: $\gamma = 1 - G[\hat{w} - (w + \Delta w^c)]$. According to equations (5) and (6), the optimal counteroffer, if positive, satisfies:

$$(\partial\gamma/\partial\Delta w^c)(V^{ft} - V^o) = -\gamma\, \partial V^{ft}/\partial\Delta w^c, \tag{10}$$

subject to $m - w > \Delta w^c$ and given $(\partial\gamma/\partial\Delta w^c) = g[\hat{w} - (w + \Delta w^c)] > 0$. The left side of equation (10) indicates the marginal gain from a larger counteroffer that increases the likelihood that the worker stays on with the firm. The right side of equation (10) denotes the expected marginal cost to the firm. As $\partial V^{ft}/\partial\Delta w^c < 0$, the capital value of the worker to the firm falls with an increase in the wage rate.

Before, given $m > w$, there existed some alternative wage offers $\hat{w} < m + \alpha$ for which the firm would consider a positive counteroffer. Now it is possible that for these alternative wage offers, the firm would no longer consider a counteroffer if, at $\Delta w^c = 0$,

$$(\partial\gamma/\partial\Delta w^c)(V^{ft} - V^o) < -\gamma\, \partial V^{ft}/\partial\Delta w^c. \tag{11}$$

The reason is that previously, the firm faced the stark choice of either making a positive counteroffer to retain the worker and reap positive, albeit reduced, rents or not doing so, in which case the worker would leave with probability one and the firm would earn no rents. Now, because the worker's nonpecuniary benefits are not known to the firm, there is no longer a discontinuous jump from zero to one in the probability that the worker remains with the firm for a small increase in the counteroffer.

The fact that the firm may now no longer respond with a positive counteroffer to specific alternative wage offers, even though it would have done so previously when nonpecuniary benefits were common knowledge, how-

ever, does not mean that the firm will never consider a counteroffer. In particular, for very high alternative wage offers, where the likelihood that the worker remains is small, there is now the potential for a positive counteroffer to generate gains. This will be the case if $\gamma/(\partial\gamma/\partial\Delta w^c) \to 0$ as the alternative wage offer approaches the upper bound of its distribution.

Case When Worker Match Value Is Private Knowledge and Search Intensity Is Endogenous

We now turn to the general case when the value of nonpecuniary benefits to the worker is the worker's private knowledge and there is endogenous search intensity. In this case, the firm must consider how a counteroffer affects not only the current retention of the worker but also the subsequent retention of the worker and, potentially, coworkers. For a single worker, the optimal counteroffer, if positive, satisfies:

$$(\partial\gamma/\partial\Delta w^c)\,(V^{ft} - V^o) = -\gamma[(\partial V^{ft}/\partial\Delta w^c) + (\partial V^{ft}/\partial s^{e\prime\prime})(\partial s^{e\prime\prime}/\partial\Delta w^c)\,]. \tag{12}$$

Comparing equation (12) to (11), endogenous search alone does not rule out an employer considering a positive counteroffer for all workers under certain circumstances. For sufficiently high alternative wage offers, the likelihood that the worker is retained without a counteroffer is sufficiently small because the reduction in profits from increasing the individual's wage are small relative to the gain in terms of increasing the likelihood that the worker is retained.

The existence of endogenous search in the context of multiple workers, however, can justify selective counteroffers. In particular, in such a case, the optimal counteroffer, if positive, satisfies:

$$(\partial\gamma/\partial\Delta w_a^c)\,(V_a^{ft} - V^o) = -\gamma[(\partial V_a^{ft}/\partial\Delta w_a^c) + (\partial V_a^{ft}/\partial s_a^{e\prime\prime})(\partial s_a^{e\prime\prime}/\partial\Delta w_a^c)\,] + (\partial V_b^{ft\prime\prime}/\partial s_b^{e\prime\prime})(\partial s_b^{e\prime\prime}/\partial\Delta w_a^c)\,. \tag{13}$$

Why is the introduction of coworkers important for the idea of selective counteroffers? The reason can be traced to the last term in equation (13). This term indicates a potential additional cost of a counteroffer in terms of the reduction in the firm's capital value of a coworker if $\partial V_b^{ft\prime\prime}/\partial s_b^{e\prime\prime} < 0$ and $\partial s_b^{e\prime\prime}/\partial\Delta w_a^c > 0$. In this case, the gain to retaining worker *a* by making a counteroffer under some circumstances can now be more than offset by the reduction in the capital value of worker *b* if a positive counteroffer results in a sufficiently large increase in the anticipated search intensity of worker *b*. This potential loss in the second worker's capital value to the firm is independent of the likelihood that worker *a* accepts the counteroffer.

III. Empirical Analysis of the Likelihood of a Counteroffer

Our discussion above suggests that firms with multiple workers and endogenous search will pursue a selective counteroffer policy in which a counteroffer is not considered for a particular worker or position in certain cases regardless of the level of alternative wage offers, while in other cases a counteroffer would be considered. To examine whether such selective counteroffer policies are consistent with the data, we rely on a 2001 SBA survey that the authors gathered for the SBA during 2001. The survey was designed to complement the 1992 SBA Training Survey, which in turn was based on the 1982 Employment and Opportunity Pilot Project. The survey instrument for the 2001 SBA survey included a series of questions for each business owner or personnel manager concerning (1) the knowledge, use, and evaluation of government training programs; (2) the characteristics of the business, such as size and industry; (3) the demographic and other characteristics of a typical worker hired by the firm; (4) the compensation and productivity of workers; (5) hiring procedures; and (6) training provided to the worker. The complete survey instrument is given in Berger, Barron, and Black (2001). Most important, as indicated in table 1, the survey also contained questions regarding the potential use of counteroffers.

The sample was constructed as follows. We first obtained a sample of businesses by employee size from the Marketing Systems Group of Fort Washington, Pennsylvania, using their Genesys Sampling System. The sample contains business names, addresses, phone numbers, and contact persons, and a few establishment characteristics, including Standard Industrial Code (SIC) and the number of employees at the establishment. Establishments were stratified into four establishment size categories in order to obtain comparisons across size groupings: 1–19 employees, 20–99 employees, 100–499 employees, and 500 and above employees. Within each establishment size stratum, a random sample of businesses across SIC industries, excluding government (SIC 900 and above) and agriculture, forestry, and fisheries (SIC 0-99), was drawn.

The Survey Research Center at the University of Kentucky conducted the 2001 SBA survey. Computer-assisted telephone interviewing was used to conduct the survey. Interviews took place from April until early September 2001. There were 1,024 completions in the 2001 SBA survey. Depending on the method of calculation that is used, the survey response rates were from 47.1% to 48.1%. A more detailed discussion of the sample dispositions and of the calculation of response rates is given in Berger et al. (2001).

Of the 1,024 completed surveys concerning the most recent hire, 124 indicated that the most recent hire was not a current employee at the firm. These respondents skipped the questions regarding counteroffers.

Of the remaining 900 respondents, we dropped 66 observations where the most recent new hire by the firm was not within 2 years of the survey date and two observations for which we did not have information on establishment size or the union status of the position. For this remaining sample of 832, we restricted our attention to the 781 employers identified in table 1 as having responded "yes" or "no" to the question of whether a counteroffer would be considered.

The data provide a number of different variables that the theory suggests should affect the value of making a counteroffer and, thus, the likelihood that a counteroffer is made. According to equation (13), one of the key factors affecting the likelihood of a counteroffer being considered is the net capital value of the retained worker to the firm ($V_a^{ff} - V^o$). In this regard, for a given wage, a counteroffer is more likely to be considered if the new hire's match value is a "good" draw from a given distribution of match values $K(m)$. One measure of a good draw in our data is a variable that indicates that the employer perceives the new employee's skills to be above the average of individuals hired for that position. For these more-skilled individuals, we expect employers to be more likely to consider making a counteroffer.

A second measure of a good draw is if the employer paid a wage to the new worker above the wage the employer typically pays to workers hired in that position. Assume that this above-average wage reflects an attempt by the employer to attract a worker with a larger match value by sharing some of the rents with the worker. If this is the case, we would expect that employers are more likely to consider a counteroffer when paying a higher starting wage than what is paid to the typical person hired for the position. This interpretation, however, relies on the presumption that starting wage differences reflect heterogeneity in match values. If one instead assumed that starting wage differences reflect heterogeneity in bargaining power across workers, then a wage higher than the typical one would imply less of the match value attained by the employer, and counteroffers would be less likely for such workers. We also include a third, interactive variable indicating individuals that have both skills that are "above average" and a starting wage that is "higher" than typical. We anticipate that the gains to the firm of "above-average" skills are mitigated by a wage "higher" than is typical.

For a given wage, if the match value for a particular type of individual is drawn from a distribution $K(m)$ that has less dispersion, then this type of individual is less likely to have a high positive net match value. If the revelation to employers of differences in ability across workers occurs over time, then with labor-market experience will come increased variation in workers' starting wages reflecting the underlying (revealed) heterogeneity in ability. This will tend to reduce the dispersion in net match values of new hires who are more experienced. That is, among experienced

applicants, there will be fewer "diamonds in the rough," that is, fewer workers hired at a starting wage substantially below their realized productivity. In our data, we have two measures of labor-market experience: the potential experience of the worker and the experience of the worker in the positions similar to the one the worker currently holds. We expect that employers will be less likely to consider counteroffers to workers with greater "potential experience" and greater "relevant experience."

In positions in which there is greater firm investment in firm-specific training or hiring costs, we would expect a greater net match value to compensate the firm for these higher costs. Greater firm-specific investments are likely for positions that include supervising responsibilities, for employees who have been at the firm longer, and for positions that indicate more substantial ongoing training. Higher hiring costs are likely for positions where it is difficult to find qualified applicants. Thus, we expect counteroffers to be more prevalent when the new hires supervise the work of others as part of their job, when the tenure of the new hires has increased, and when they spend more time in various training/upgrading activities while at work.[13] Hiring costs are likely lower when the applicant pool has more qualified applicants. Thus, we expect that counteroffers are less likely to be considered, the greater the fraction of applicants (other than the one hired) that the employer deemed as qualified for the position.

As we have seen, an important determinant of the value of counteroffer is the effect it has on the search intensity of coworkers. A counteroffer is less likely if there are greater costs of doing so in terms of its impact on the search intensity of other workers. An increase in the number of coworkers in comparable positions increases this potentially adverse effect of a counteroffer on other workers' search intensity, as these workers are not only more likely to be aware of the counteroffer but also to take such a counteroffer as indicative of a higher likelihood that they too would receive a counteroffer to an alternative wage offer. Similarly, the larger the establishment size, the greater are the number of coworkers whose search intensity can be adversely affected (from the firm's point of view). Thus, we expect that counteroffers are less likely to be considered at firms

[13] For simplicity, the model assumes the match value of a particular worker at a particular firm is known to the employer at the time of hire. If this were not the case, however, then increased tenure could provide additional information to the current employer as to the match value of a worker. If this information is at least partly private, then wages would not fully adjust to reflect this, such that the dispersion of net match values would increase with tenure. The result would be an increase in the likelihood of a counteroffer because some workers now reveal themselves to their current employer as "diamonds in the rough." This analysis reinforces our prediction regarding the effect of tenure on the likelihood of a counteroffer.

that hired more than one worker to fill the same type of position and at larger establishments.

One issue that we have not addressed regarding counteroffers is one that can arise in a principal-agent setting. The adverse impact of a counteroffer on the net value of matches to the firm (principal) is likely not fully appreciated by a supervisor (agent) making the counteroffer decision. In addition, the supervisor may reap unobservable gains to retaining the worker. These gains could arise from a personal relationship with the coworker receiving the wage offer or because the retention of the worker reduces the supervisor's workload, allowing the supervisor to avoid the hiring and training costs associated with a new hire. Such agency problems can lead to excessive counteroffers. As a result, a firm may restrict the ability of the supervisors to make a counteroffer. In the context of our model, this means introducing additional costs to making counteroffers for the decision maker beyond their effect on worker search intensity.

In table 2, we provide a summary of our predictions as well as presenting the estimation results for a probit model of the likelihood that a counteroffer would be considered. We have included in our counteroffer estimations not only the variables discussed above but also control variables indicating whether the position was covered by a union contract and the years of education of the worker hired. With the inclusion of the education variable, one should interpret potential experience as reflecting age.

On the whole, the results reported in table 2 are consistent with the predicted pattern of signs. Interestingly, the positive sign on the variable indicating a wage higher than typical supports the interpretation of this variable as indicative of a higher initial match value that is shared with the worker. In all cases, the signs on the variables are as expected, and with the exception of worker tenure and the interaction term indicating both wage and skill level higher than the typical worker, the effect of the variables on the likelihood of a counteroffer is statistically significant.

To get a feel for the magnitudes of these estimates, in table 3 we provide some estimates of the differences in the likelihood of consideration of a counteroffer for various workers and positions. In table 3, we ask what would happen if different covariates of interest were set to the values listed in the table, holding constant the distribution of other covariates. The first entry provides the mean predicted probability for the overall sample of 0.439. For the second entry, we assign each worker a starting wage and skill level equal to that of the worker who would typically fill the position; in this case, the predicted probability a counteroffer is considered falls to 0.363. Fifty-two percent of the workers in our sample fall into this category. If the worker was paid the typical wage but had above-average skills, then the probability that a counteroffer is considered rises to 0.479. Approximately 34% of the workers in the sample fall into this category. For the 10% of workers in the sample who not only had skills

Table 2
Estimates of Likelihood of Counteroffer Consideration

Variables	Means (SD)	Expected Sign	Likelihood of Receiving a Counteroffer (Probit)
Skills above that of typical person hired for the position	.442	+	.3427
	(.497)		(3.17)**
Starting wage higher than typical person hired for the position	.141	?	.8484
	(.348)		(3.43)**
Skills above typical and starting wage higher than typical	.097	−	−.4766
	(.297)		(1.55)
New hire's no. of years of potential experience (age − education − 6)	12.006	−	−.0165
	(10.693)		(2.94)**
New hire's no. of years of relevant experience	3.521	−	−.0189
	(6.087)		(1.86)+
Log of total hours per year of ongoing training for new hire	2.692	+	.0761
	(1.897)		(2.76)**
No. of months new hire employed by firm (tenure)	6.799	+	.0136
	(4.804)		(1.36)
New hire supervises work of others as part of job	.177	+	.4826
	(.382)		(3.42)**
Fraction of applicants not receiving an offer who were qualified	.356	−	−.3206
	(.394)		(2.49)*
Firm hired more than one worker for same position at same time	.365	−	−.4556
	(.482)		(4.25)**
Log of establishment size	5.179	−	−.0496
	(2.419)		(2.27)*
Union position	.106	−	−.8941
	(.308)		(4.78)**
New hire's years of education	13.296		−.0124
	(2.112)		(.49)
Constant			.2921
			(.78)
Observations	781		781
Mean of probability counteroffer would be considered			.44

NOTE.—Robust *z*-statistics in parentheses for probit. Not reported are coefficients for five dummy variables that indicate missing values for the following five continuous variables: relevant experience (7.2%), age of new hire (4.1%), ongoing training (7.9%), percentage of qualified applicants (6.0%), and years of education (3.2%). Excluding observations missing one or more of these five variables reduces the probit sample from 781 to 605. The probit results above (in terms of statistical significance) are robust to excluding these observations, and in fact the interaction variable of above normal skill and high wage becomes statistically significant for this smaller sample.

+ Significant at 10%.
* Significant at 5%.
** Significant at 1%.

Table 3
Predicted Likelihood of Counteroffer Consideration For Different Types of Workers, Positions, and Firms

	Predicted Likelihood of a Counteroffer
Mean of sample	.439
New worker with typical starting wage and typical skill level	.363
New worker with typical starting wage and skill level above typical new hire	.479
New worker with starting wage and skill level above typical new hire	.606
New hire with relevant and potential experience equal to the 75th percentile	.388
New hire with relevant and potential experience equal to the 25th percentile	.504
Percentage of qualified applicants equal to the 75th percentile	.395
Percentage of qualified applicants equal to the 25th percentile	.474
New hire with ongoing training and tenure at firm equal to the 25th percentile, and who does not supervise others	.331
New hire with ongoing training and tenure at firm equal to the 75th percentile, and who supervises others	.624
Firm with establishment size equal to the 75th percentile and hired more than one worker at the same time	.311
Firm with establishment size equal to the 25th percentile and did not hire more than one worker at the same time	.524

NOTE.—In-sample predictions based on probit estimation reported in table 2.

above average but also a wage higher than the typical new hire, the probability that a counteroffer is considered rises further to 0.606.

The degree of experience workers have also has a substantial effect on the likelihood of a counteroffer. If we limit both the potential and relevant experience of workers to the 25th percentile, the likelihood of a counteroffer being considered is 0.504, which is substantially higher than workers at the 75th percentile of potential and relevant experience (0.388). This difference suggests that younger, less-experienced workers are more likely to receive a counteroffer than their older, more-experienced counterparts. In the context of our model, we view workers with less experience as having more dispersion in their distribution of match quality ($K[m]$ in the notation of our model) than workers whose experience allows firms to better ascertain the quality of the match.

Our next experiment seeks to measure how employers respond when recruiting the worker was difficult, which presumably indicates a tight labor market. Toward that end, we compare the likelihood of a counteroffer when the fraction of qualified applicants not hired is at the 25th percentile relative to the 75th percentile. When the market is tight, the probability of an employer considering a counteroffer is 0.474 relative to 0.395 when there are a large number of qualified applicants.

We next wish to examine the impact of having positions in which workers have been the recipients of firm-specific investment. Toward that end, we compare workers who have ongoing training levels and tenure equal to the 75th percentile and who supervise other employees relative to workers who have ongoing training levels and tenure equal to the 25th percentile and who do not supervise others. The differential is dramatic. Workers with more ongoing training and tenure and who supervise other workers have a probability of being considered for a counteroffer of 0.624 relative to 0.331 for workers with less training and tenure and who do not supervise others. Thus, workers with substantial firm-specific investments are much more likely to receive counteroffers than workers without such investments.

Finally, we wish to explore how the presence of other coworkers affects the likelihood of a counteroffer. We compare workers who are at firms in the 25th percentile of establishment size that did not hire any additional workers to workers who are at firms in the 75th percentile of establishment size that hired additional workers. Workers at smaller establishments who were not hired with other workers have a 0.524 chance of being considered for a counteroffer relative to a probability of 0.311 for their counterparts at larger establishments who were hired with other workers. Of course, whether this reflects the potential externality on the search activity of coworkers or potential agency problems cannot be identified from these estimates.

Taken together, these experiments indicate that characteristics of firms, of positions, and of the quality of specific matches each can have substantial impacts on the likelihood of a counteroffer. Interestingly, the patterns do not mirror the wage paid to workers. Younger workers and workers at smaller establishments are likely to be paid lower wages but are more likely to receive counteroffers. Thus, as noted earlier, counteroffers do not appear to be restricted to the realm of high-paying jobs.

IV. Concluding Remarks

In 1990, employers' discretion in the use of counteroffers was suggested by the following that appeared in the *Wall Street Journal*: "To workers who get other job offers, 38% of employers say they wouldn't extend a counter bid, and 21% say they would, Management Recruiters International finds. But 38% say it all depends" (*Wall Street Journal* 1990, A1). This article has developed a setting in which firms pursue "selective" counteroffers, one that is consistent with the 38% of firms in the quote who indicate that an extension of a counteroffer "depends." Further, we find patterns regarding the likelihood of a counteroffer largely consistent with a theory of selective counteroffers. As our data contain only one

observation per firm, however, the variation we observe could be compatible with counteroffer policies that only differ across firms.

Accepting our view that selective offer policies are not uncommon has important implications for the functioning of labor markets. If a significant number of firms are willing to make selective counteroffers, then this suggests that for some workers the labor market is characterized as having negotiated wages rather than wages determined in a neoclassical labor market. While perhaps not too controversial, it does increase the importance of negotiation skills, especially given that workers' nonpecuniary benefits are private knowledge. In this regard, Babcock and Laschever (2003) have recently argued that gender differences in the aggressiveness and skills of negotiation with employers may generate substantial gender gaps in negotiated salaries.

The existence of selective counteroffers also has implications for a firm's view regarding the hiring of workers who are currently employed. Golan (2005) considers the potential for a winner's curse in hiring the employed under the assumption that the current employer adopts a simple matching policy for counteroffers. Our analysis of selective counteroffers suggests that at times a firm's counteroffer will not reflect all the rents, and this will tend to mitigate the adverse selection element to hiring employed workers.

Kugler and Saint-Paul (2004) point out that if firing costs were to increase, this not only reduces the quality of those let go but reduces the relative quality of the unemployed relative to the employed as potential new employees for other employers. Our analysis of selective counteroffers suggests, however, that were we to introduce firing costs, one also has to consider the effect on the quality of employed workers who accept outside offers, as such workers will not receive counteroffers, while other, more productive workers do have a positive probability of receiving a counteroffer.

There are several extensions of our analysis that could be considered. One extension is suggested by the finding that while the likelihood of a counteroffer is clearly predictable, unreported results suggest no systematic pattern with respect to the magnitude of the counteroffer among those who indicated that they would consider a counteroffer. One interpretation of this result is that it may be that the information workers collect regarding firm's responses to outside offers received by coworkers is limited to whether the firm responded, not the magnitude of the response. This is consistent with the fact that many firms discourage workers from sharing information on the actual wages each is paid. Such a limitation on the information exchanged among coworkers could simplify the analysis as workers' updating could now simply be in terms of the likelihood of a counteroffer. A second extension that would complicate the analysis is to introduce strategic behavior on the part of the worker

in terms of which outside offers to reveal to the firm. Such screening of outside offers likely occurs, and it will clearly affect the optimal counteroffer policy.

A final extension could be to broaden the interpretation of the responses of coworkers to a counteroffer. In particular, we have presumed that an important cost to the firm of making a counteroffer is that it raises the search intensity of coworkers. There can be, however, other reactions as well that are also not beneficial to the firm. For instance, let us presume that a counteroffer to a worker leads a coworker in a similar position at the firm to update their perception of the magnitude of rents accruing to the firm for such positions. If the worker now perceives the firm obtaining greater rents from their efforts, the worker will also likely anticipate a lower cost to shirking, especially if the firm punishes such behavior only if productivity falls below the wage. This will lead the worker to cut back on work effort. Such a view suggests that employers are concerned about the effects of a counteroffer on worker morale not only in terms of increased search intensity by coworkers, and thus the likelihood they leave the firm, but also in terms of reduced work effort by coworkers.

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