Contracts, Individual Revenue and Performance

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Abstract:

In some jobs individual workers have control over revenue, effort and productivity. These jobs include professional firms for law, medicine and consulting. They include personal services in areas from hair styling to taxi driving. The firm offers contracts that allow for a sharing of risks and rewards. These incentives include a split of output between the firm and worker and employee ownership. For U.S. real estate agents, a choice is available between splitting revenue with the firm or retaining 100 % above a fixed prepaid minimum. These are equity and sequential debt contracts. Under the sequential debt contract, effort increases but output per hour declines. Separately, agents increase effort and productivity if offered ownership in the firm, effectively a claim on others' performance.

Keywords: Debt contracts | Effort | Productivity

Article:

Introduction

Some jobs allow individual workers control over revenue, effort and performance. Performance includes effort and productivity or output per hour. These jobs include professional firms in law, medicine, consulting and architecture. The individual professional is a revenue generator. That includes the billable hour for the professional and the revenue per service performed by the doctor.

Individual revenue generation is not confined to the professions. The salon has its stylists and manicurists. The gym offers its trainers. The taxi company has its cabdrivers. The *National Income and Product Accounts* for the United States for 2010 indicates that services are nearly four-fifths of total output.

The firm offers contracts that allow for a sharing of risks and rewards. These incentives include a split of output between the firm and worker and employee ownership. With individual revenue of

the lawyer or taxi driver available, the employer has a choice of offering a proportional split or allowing the employee to retain 100 %. The 100 % retention is in exchange for an up-front fixed payment. In effect, proportional equity and sequential debt contracts are not confined to financial markets. They govern millions of employees who go to work every day.

The application of these contracts is to real estate agents. These agents are offered an employment contract with two incentive features. One is to choose between a proportional split of revenue as against 100 % of revenue in exchange for a fixed payment. The other is for a stake in the firm, a claim on other agents' net income.

A 100 % revenue payout and ownership are contract provisions for the employed small business operator. A 100 % payout offers the employee to retain all revenue in exchange for fixed payments to the firm. Ownership offers a stake in the firm's profit. Because the firm is typically specialized in one industry, ownership provides incentives to contribute to teamwork and cohesion. The 100 % payout contract has the opposite effect. The nominal employee receives all of the revenue and has less of an incentive to work as part of a team. Consequently, there are potential conflicts between the two types of compensation.

There is a two-stage structure leading to performance. In the first stage the employed small-business operator selects the contract. That determination depends on exogenous characteristics including demographic variables, experience and financial position. In the second stage the individual's performance is measured by revenue conditional on the contract. Controls are included for local market conditions, size of firm and individuals' characteristics. Ownership increases the incentive to work synergistically and a 100 % payout rewards an individual focus on revenue generation. Whether both conditions separately contribute to performance or are in conflict is testable.

The sample includes 3,020 U.S. real estate agents surveyed in spring 2008. They are employees but have contracts offering ownership and 100 % revenue payouts. In the first stage a probit equation estimates the probability of taking ownership in the firm and a 100 % payout of individual revenue. The second stage estimates performance conditional on the contract. The contract has two separate inverse Mills ratios for the conditional probabilities of earning a split and ownership. Performance is individual revenue before and after expenses and income taxes.

The application addresses identification issues that plague selection problems. In the classic labor supply model, in the first stage a person is choosing whether to work or not. In the second, the person chooses how much to work. The problem is that similar variables affect both decisions, leading to identification problems. In the application here, there are several blocks of variables, including for the firm, market location, and for the demographics of the person. The firm offers the contract, but cannot use the demographics in the selection. Demographics include protected variables for gender, age, marital status, race and ethnicity that employers cannot use

in setting working conditions. In the second stage the worker's performance is based on these demographic variables along with household income and tax rates.

There are four main conclusions. First, while offering ownership increases productivity, a 100 % payout contract does not. In a 100 % payout contract the agent cannot focus on individual income generation because of managerial responsibilities associated with running a small business. In contrast, ownership generates higher individual revenue. [1] Accepting more revenue and expenses is dissipative. Second, the results are robust to whether revenue is defined before or after expenses borne by the nominal employee. The improved performance of owners is not because of a difference in expenses.

Third, the contract is concentrated in certain ethnic and demographic groups. The probability of having ownership and receiving 100 % of individual revenues rises by 1.4 % for 1 year of experience, though at a decreasing rate. Wealthier individuals are more likely to be owners. Experienced workers take both parts of the contract. Women are less likely to be employed entrepreneurs. African and Asian Americans are more likely to participate in the ownership part of the contract.

Fourth, finance theory suggests that a sequential debt-equity contract orders priorities and incentives. Monitoring is facilitated by the debt-holder being paid with a priority claim. Here, the results do not always confirm greater output from sequential payment. Performance is lower when service workers receive 100 % of the revenue in exchange for a fixed payment.

Section "Background" has background literature. Section "Specification" describes the model. Section "Empirical Application and Data" details the data on the contract and empirical application. The findings are reported in Section "Findings". Section "Concluding Remarks" provides implications and conclusions.

Background

Employment growth rate in personal services in the United States since 1990 has been almost twice that of all jobs. There were 232,000 people employed as taxi drivers in April 2011, up from 190,000 in the 1990 Census. The cabdriver typically retains all revenue during a shift, renting the taxi from an owner. [2] The Bureau of Labor Statistics reports 820,000 employed as barbers, stylists and at salons in April 2011and projected to grow by 15 % to 2018. An additional 10 % of all employment in the United States is in professional and business services where this model predominates. In professional services, the lawyer or doctor operates as an individual revenue generator with an employing firm paying the expenses.

In 2010 more than half of all doctors and two-thirds of new medical residency graduates worked at hospital-owned practices where expenses are centrally managed.[3] The American Bar Association confines ownership of law firms to attorneys.[4] Instead of being a conventional small-business operator hiring staff and paying rent, the doctor or lawyer operates an individual small

business focused on revenue inside a larger one. The parent firm has separate contracts offering each employee a share of profits and individual revenue.

At professional services firms including accounting, law, consulting, architecture and medicine, employees are expected to generate revenue. The parent firm covers expenses. Firms hiring Yale Law School graduates expect billable hours of 1,700 and 2,300 a year.[5] A lawyer billing 2200 h at $300 each generates $660,000 annually. For a lawyer being paid one-third of billings, a reported salary including benefits is $220,000 a year. This is not strictly a salary, but instead a revenue-sharing contract. The split is not limited to one-third. While atypical for new hires, the lawyer can receive up to 100 % of gross revenue in exchange for making a fixed payment to the firm. Once becoming a partner or shareholder the lawyer additionally has rights to ownership, or a claim against the firm's profit. The firm is covering operating expenses for the office, facilities, technology and support.

For such nominal employees, the risk of self-employment and covering both expenses and revenues are reduced. Although there has been a long-term rise in self-employment, this phenomenon may be attributable to rising costs of taxes and benefits (Blau (*1987*)). The effect of tax rates is mixed. Fölster (*2002*) finds that higher marginal tax rates reduce self-employment by lowering returns to entrepreneurial activity. The growth of nominal employees operating small businesses coexists with the rise in self-employment.[6] Ajayi-Obe and Parker (*2005*) find that when given flexibility, even in self-employment workers tend to put in more hours and effort.

In medicine, the rationale is to provide incentives to generate patient billings while freeing doctors from office paperwork. Ittner et al. (*2007*) examine compensation structures in medical practices.[7] The central management and taking of expenses by the parent firm allows the revenue generator to use skills and creativity as opposed to standardization.

Baker and Winkler (*2012*) examine the conditions under which workers will cooperate while on the job. They find that cooperation depends on the level of job commitment. Cooperation is relevant among real estate agents in sharing information and listings. This cooperation is restricted if some agents are receiving high proportions of compensation and commissions. Walker (*2009*) notes that professional and personal services offer opportunities for flexibility. That flexibility does differ by gender. Men tend to be employed in professional services where compensation is higher. Women are employed in personal services where compensation is lower.

Entrepreneurs are individuals seeking opportunities in the discovery and exploitation of profitable opportunities. Entrepreneurship's boundaries are based on the individual, opportunities, technology and the environment (Busenitz et al. (*2003*)).[8] The business, professional and personal services firm focuses on the individual, even as the rote tasks are centralized.

While these structures mitigate risk, entrepreneurs are not necessarily viewed as willing risk takers. Schumpeter (*1934*, 137) claims that "The entrepreneur is never the risk bearer. The one

who gives credit comes to grief if the undertaking fails. Risk-taking is in no case an element of the entrepreneurial function." Nevertheless, the employed small-business arrangement is consistent with entrepreneurs taking calculated risks (Chell et al. (*2001*)), Wennekers et al. (*2005*). In contrast to other studies, Berglann et al. (*2011*) includes partly self-owned limited liability companies in their study of the origins and returns of entrepreneurship. Using this more expansive definition, entrepreneurship is profitable but with a larger variation. Cressy (*2004*) suggests that entrepreneurs have decreasing absolute risk aversion. Rauch and Frese (*2007*) find that the willingness to take risk does not increase the probability of success. Personality traits are determinants of success, including the need for achievement, motivation and a willingness to take risks. In Villette and Vuillermot (*2009*) entrepreneurs minimize risk through predation, taking advantage of market imperfections and pursuing them extensively.

The highly successful operate where there are barriers to entry but with access to capital. Blanchflower and Oswald (*1998*) note that the receipt of a large gift or inheritance increases the probability of becoming self employed. The probability of entrepreneurship increases 2 to 3 % when the province of working population density is doubled.

Entrepreneurs value autonomy, providing a rationale for the 100 % payout contract. But autonomy has its cost. Lazear (*2005*) proposes that the entrepreneur becomes a jack-of-all-trades who has to be competent in many areas rather than just one. Also, that valuation of autonomy indicates that entrepreneurs earn returns below those from holding a passive index fund (Moskowitz and Vissing-Jorgensen (*2002*)). The lower return is in addition to the cost from not being diversified. The firm is taking the risks for this employee (Zahra and Pearce (*1994*)). Hurst and Lusardi (*2004*) and Polkovnichenko (*2007*) note that those with low wealth are discouraged from becoming small-business owners despite low-risk opportunities. Gormley et al. (*2010*) find that avoidance of loss explains why saving is high in poor communities. People bypass profitable opportunities even when risk is minimal.

Specification

The contract has a split *s* of individual revenue and an ownership stake *p*. The limit is with a 100 % payout and *s* = 1. The split is predetermined before the employee determines revenue. There is a recursive structure with the expectation of correlation between the 100 % payout contract and ownership so it is constructed as a bivariate probit. The first equation addresses whether the employee opts for 100 % control of individual revenue or instead chooses a split. The second is based on whether the agent is an owner. This equation includes demographic, firm and market demand and technology variables. The contract is negotiated before performance during the year is known.

Given the contract choice, the second step is its incentive effects. This step is modeled using a sample selection regression with the dependent variable being the logarithm of individual revenue. The independent variables include dummy variables for ownership and 100 % payout

contracts and self-selection terms for each from the bivariate probit. Because the equations are recursive, identification problems associated with simultaneous equations are controlled.

The first estimation step is for a 100 % payout of individual revenue. This decision $d = 1$ has determining variable $z1=X1\beta1+\varepsilon1>0$. The observed characteristics are X_1 with coefficients β_1 and error ε_1. Otherwise $d = 0$ and the agent splits individual net revenue with the firm. The decision for ownership in the firm where $e = 1$ is determined by $z2=X2\beta2+\varepsilon2>0$. Otherwise $e = 0$ and the agent has no ownership. The bivariate probit is

$$\begin{cases} d = \begin{cases} 1 & z_1 = X_1\beta_1 + \varepsilon_1 > 0 \\ 0 & otherwise \end{cases} \\ e = \begin{cases} 1 & z_2 = X_2\beta_2 + \varepsilon_2 > 0 \\ 0 & otherwise \end{cases} \end{cases} \quad \varepsilon_1, \varepsilon_2 \sim N(0, \Sigma). \quad (1)$$

Here Σ is the variance-covariance matrix of the errors. The variances are standardized at unity. The correlation coefficient between the errors for taking on debt and equity is ρ.

The second step estimates performance in individual revenue conditional on the contract. Recovered from the first step are two inverse Mills ratios for each contract provision on the 100 % payout and ownership. These ratios are m_1 and m_2 with respective coefficients λ_1 and λ_2. The fitted inverse Mills ratios from the first-stage regression are variables in the income equation in the second step as

$\ln Y=X\beta+\delta1d+\delta2e+\delta3ed+\lambda1m1+\lambda2m2+\varepsilon.$ (2)

The variables X determine performance with parameters β. The dummy variables are d, e to be on a 100 % contract or to receive equity. The interaction term between the two provisions is ed. The self-selection conditional probabilities of receiving 100 % of individual revenue and ownership equity are m_1, m_2. The error is ε.

Empirical Application and Data

Real estate agents are employees of the firm where they work. They are not paid on salary but receive a split percentage of the gross revenue produced.[9] The firm retains the remainder. Agents have the choice of a 100 % payout contract. In exchange for retaining all revenue the agent makes an advance payment to the firm. There is a separate option for ownership in the firm. Some agents are the sole owners, similar to conventional entrepreneurs.

These contracts are not unique to real estate agents, but are present in accounting, law, consulting and other business, professional and personal services. Real estate agents are selected as representative cases of these contracts. The industry has characteristics of other business and

professional services. These include the degree of autonomy afforded, clear measures of performance in sales revenue, extensive competition within the industry, and the contractual nature of employment.

The primary data are from a 2008 National Association of Realtors (NAR) survey of real estate agents.[10] Respondents provided responses on the characteristics of their employing firms. The data are for the 2007 calendar year.[11] Median single family home prices are provided separately by the NAR. Employment data are from the Bureau of Labor Statistics. The NAR and BLS data sets are matched by zip code for the bivariate probit and regression. An overview of the variables is shown in Table 1.

Table 1 Variable descriptions

Demographic:
Marital status (Married = 1)
Gender (Female = 1)
Ethnicity (African-American = 1)
Ethnicity (Hispanic = 1)
Ethnicity (Asian = 1)
Skill:
Years of schooling
Years of real estate brokerage experience
Square of real estate brokerage experience
Broker has a personal webpage for business (Personal webpage = 1)
Real estate as second career (Second career =1)
Number of residential investment properties held
Number of commercial investment properties held
Full-time work status (Full-time = 1)
Agent is an associate broker (Associate broker = 1)
Contract:

100 % payout contract status (No split of commission with the firm = 1)
Agent is a broker–owner (Broker-owner = 1)
Income and Business Expenses:
Annual gross income of the agent
Annual household income of the agent
Natural logarithm of the gross income of the agent (before business expenses and taxes)
Natural logarithm of net income of the agent (after business expenses and taxes)
Natural logarithm of business expenses of the agent
Natural logarithm of annual household income of the agent
Firm Characteristics:
Independent franchise status (Independent franchise = 1)
Natural log of firm size (Number of sales employees)
Profit sharing plan status (Profit sharing plan = 1)
Market Environment:
Percent change in employment in the metropolitan in 2007
Natural log of median metro area single-family house prices in 2007

The independent variables are divided into five categories including contract, demographics, skills, firm, and the market environment. The contract variables include a 100 % payout, ownership, and the corresponding sample selections based on conditional probabilities. Demographics include marital status, gender, race and ethnicity. Skills are education, experience, whether real estate is a second career, full-time work status, and ownership of residential and commercial property. Skills encompass technology such as whether the individual has a separate website for real estate listings. The firm variables include size and dummy variables for a franchise and offering profit sharing. Market demand is captured by the natural logarithm of median metropolitan house prices and the percentage growth of local employment during 2007. The variables include those protected by employment legislation including race, ethnicity, gender and marital status. Variables not protected under law include experience, schooling, real estate as a second career, being an associate broker and full time

work status. The natural logarithm of employment at the firm measures size. Market metro area characteristics include the natural logarithm of the median single-family house price and the percentage change in employment in 2007.

The total effect in the bivariate model is for the probability of selecting ownership and a 100 % payout contract. For each characteristic there is a direct probability of selecting ownership. There is a separate indirect probability of ownership given the 100 % payout contract. The ownership and 100 % payout contract probit equations share as explanatory variables schooling, experience, marital status, gender, ethnicity, real estate as a second career and firm size. The ownership probit includes the natural logarithm of the median metropolitan house price, the percentage change in area employment and the natural logarithm of household income. The 100 % payout contract equation includes variables for associate broker status, real estate listings webpage, and full-time work status. These are related to ability and skills but not necessarily wealth.

There are two stages. In the first, the agent receives a contract prior to performance. In the second, performance is determined. That first stage offers natural identifying restrictions. Contracts cannot be based on protected variables in the demographic characteristics. The firm is not permitted to use gender, age, marital status, race or ethnicity in determining the split with the employee.

The second stage involves the employee's performance. That performance may depend on demographics, but the firm cannot use them in setting the contract. The separation of variables allows identification to take place. The natural logarithm of gross and net revenue and business expenses are three separate dependent variables. The performance is conditional on having ownership, a 100 % payout contract and the conditional probabilities of both.

Whether predetermined contract incentives lead employed small-business operators to be more productive is testable. Having to perform all tasks makes an agent potentially liable for added out-of-pocket business expenses incurred separately from the firm's overhead. Ownership gives an employee an incentive to work with others while retaining an entrepreneurial incentive. By comparison, the 100 % payout contract reduces the incentive to work with others and leads to dissipative activity.

Descriptive statistics are in Table 2. There are 3,020 agents in the sample. Those who have ownership represent 13.5 % of the sample. Of these at-work entrepreneurs, 407 agents or 13.5 % are owners. There are 348 agents or 11.5 % of the sample who are on 100 % payout contracts receiving all individual revenue. The remaining 88.5 % are on contracts splitting their individual revenue generated with the firm. Employed entrepreneurs have higher wealth. They own 1.81 houses as investments, as compared with 0.98 in the overall sample. They own twice as many commercial properties. Their household income is 17 % higher than the overall sample.

Table 2 Descriptive statistics

Variable	All			Owners			100 % contract		
	Mean	**Std. Dev.**	**Obs.**	**Mean**	**Std. Dev.**	**Obs.**	**Mean**	**Std. Dev.**	**Obs.**
Schooling	14.763	1.963	3020	14.853	2.008	407	14.678	1.950	348
Experience	11.071	9.689	3006	16.225	10.859	405	15.960	10.635	346
Experience squared	216.415	333.530	3006	380.857	437.842	405	367.474	419.148	346
Married	0.722	0.448	3020	0.767	0.424	407	0.773	0.420	348
Female	0.577	0.494	3020	0.445	0.498	407	0.471	0.500	348
African-American	0.029	0.169	3020	0.049	0.216	407	0.040	0.197	348
Hispanic	0.036	0.187	3020	0.029	0.169	407	0.040	0.197	348
Asian-American	0.027	0.162	3020	0.042	0.200	407	0.014	0.119	348
Real estate as second career	0.962	0.192	3020	0.921	0.269	407	0.945	0.228	348
Real estate listings webpage	0.588	0.492	3020	0.703	0.458	407	0.716	0.452	348
Resid. property investment	0.988	2.391	3016	1.882	3.777	406	1.810	3.975	348
Comm. property investment	0.166	0.725	2999	0.552	1.396	404	0.285	1.248	347
Full time	0.875	0.331	3020	0.914	0.281	407	0.882	0.323	348
Associate broker	0.161	0.368	3020	0.032	0.176	407	0.129	0.336	348
100 % contract	0.115	0.319	3020	0.364	0.482	407	1.000	0.000	348
Broker-owner	0.135	0.342	3020	1.000	0.000	407	0.425	0.495	348
Profit sharing	0.035	0.183	3020	0.118	0.323	407	0.017	0.130	348
Independent franchise	0.378	0.485	3020	0.273	0.446	407	0.399	0.490	348
ln(Sales staff size)	3.893	1.838	3020	2.296	1.706	407	3.102	2.034	348
Ln(Median metro house price, $000)	5.550	0.495	2121	5.530	0.486	285	5.445	0.407	274
Percent Chg. metro area empl.	1.009	1.398	2362	1.074	1.451	310	1.053	1.540	296

Ln(Gross income)	10.612	1.080	3020	11.092	0.931	407	11.166	0.853	348
Ln(Net income)	10.136	1.061	3020	10.556	0.982	407	10.583	0.989	348
Ln(Business expenses)	8.858	1.387	2942	9.207	1.633	400	9.475	1.455	344
Ln(Household income)	11.510	0.719	3020	11.673	0.675	407	11.711	0.633	348

Findings

Table 3 reports results the probability of taking the 100 % payout contract versus a proportional split. The selection decision is based on personal characteristics along with firm size and technology. The log likelihood for the equation is statistically significant at the 1 % level.

Table 3 Probability of 100 % contract versus split

Variable	Probit equation		Marginal effects	
	Coeff.	**T-Ratio**	**Coeff.**	**T-Ratio**
Constant	−1.3314[b]	−4.115	−0.2240[b]	−4.130
Schooling	−0.0056	−0.342	−0.0009	−0.342
Experience	0.0590[b]	5.748	0.0099[b]	5.866
Experience squared	−0.0009[b]	−3.136	−0.0001[b]	−3.166
Married	0.1327	1.803	0.0215	1.878
Female	−0.1980[b]	−3.080	−0.0340[b]	−3.023
African-american	0.3690[a]	2.160	0.0770	1.806
Hispanic	0.1906	1.192	0.0359	1.076
Asian-american	−0.2834	−1.219	−0.0398	−1.498
Real estate as second career	−0.0167	−0.109	−0.0028	−0.108
ln(Sales staff size)	−0.1193[b]	−6.801	−0.0201[b]	−6.857
Associate broker	−0.1778[a]	−1.998	−0.0276[a]	−2.170
Real estate listings webpage	0.2319[b]	3.432	0.0380[b]	3.533

Full time	0.0201	0.204	0.0034	0.207
Log likelihood		−1073.30		
Chi square		202.59		
N		3006		

[a]Statistically significant at the 0.05 level

[b]Statistically significant at the 0.01 level

One additional year of experience increases the probability of taking the no-split contract by 1 %.[12] The impact is concave and decreasing with experience. Larger firms are less likely to offer the contract. Those with associate broker credentials are less likely to take them. In both cases, the probability of taking a 100 % payout contract falls by 2.0 %. Those who are married have a 2.2 % higher probability of taking a 100 % contract. Women have a 3.4 % lower probability of having the 100 % contract. African-Americans have a 7.7 % higher probability of retaining all individual revenue generated; the base for comparison is Caucasian agents. Asian-American and Hispanic groups have no difference in probability of accepting a 100 % payout contract.

Table 4 has the analogous one-way probit estimates for the probability of holding ownership in the firm. The log likelihood of the model is statistically significant at the 0.01 level. The effect of experience on ownership is positive and similar to the 100 % contract results. An additional year of experience increases the probability by 0.9 %.

Table 4 Probability of ownership

Variable	Probit equation		Marginal effects	
	Coeff.	T-Ratio	Coeff.	T-Ratio
Constant	−1.3184	−1.501	−0.1836	−1.504
Schooling	0.0163	0.735	0.0023	0.734
Experience	0.0649[b]	4.491	0.0090[b]	4.569
Experience squared	−0.0010[a]	−2.406	−0.0001[a]	−2.438
Married	−0.0456	−0.450	−0.0064	−0.444
Female	−0.3682[b]	−4.286	−0.0535[b]	−4.092
African-American	0.5416[b]	2.853	0.1054[a]	2.199

Hispanic	−0.2012	−0.930	−0.0245	−1.075
Asian-American	0.5852[b]	2.933	0.1169[a]	2.233
Real estate as second career	−0.6306[b]	−3.339	−0.1293[a]	−2.496
ln(Sales staff size)	−0.3801[b]	−14.890	−0.0529[b]	−14.149
Ln(Median metro house price in $000)	−0.0975	−1.073	−0.0136	−1.072
Percent Chg. metro area employment	0.0129	0.401	0.0018	0.400
Ln(Household income)	0.1757[b]	2.670	0.0245[b]	2.669
Log likelihood		−546.71		
Chi square		422.13		
N		1883		

[a]Statistically significant at the 0.05 level

[b]Statistically significant at the 0.01 level

African-Americans have a 10.5 % greater probability of ownership than non-Hispanic whites. The analogous estimate is 11.7 % higher among Asian-Americans. Women are 5.4 % less likely to have an ownership stake than men. Those for whom real estate is a second career are 12.9 % less likely to be an owner. Ownership probabilities are increasing in total household income and decreasing at large firms.

The estimates of the probabilities of having a 100 % payout contract and being an owner are set as starter values for the bivariate probit. The estimates for the probabilities of having a 100 % contract and ownership are in Table 5. The correlation between the disturbances of ownership and retaining all generated income is 0.37. The Wald hypothesis that this correlation is zero has a t-statistic of 5.35, significant at the 1 % level. The first block of results is for ownership and the second for the 100 % payout contract, the analogues of Tables 3 and 4.

Table 5 Probability of a 100 % contract and ownership

	Ownership		100 % Contract		Marginal effects			
	Coeff.	T-Ratio	Coeff.	T-Ratio	Direct	Indirect	Total	Dummy
Constant	−1.1963	−1.394	−0.6587	−1.676	–	–	–	–

Schooling	0.0155	0.685	−0.0346	−1.721	0.0046	0.0030	0.0076	–
Experience	0.0638[b]	4.100	0.0582[b]	4.102	0.0188[b]	−0.0051[a]	0.0137[b]	
Experience squared	−0.0009[a]	−2.108	−0.0009[a]	−2.417	−0.0003[a]	0.0001	−0.0002	–
Married	−0.0229	−0.235	0.1649	1.801	−0.0067	−0.0144	−0.0211	−0.0215
Female	−0.3558[b]	−4.023	−0.2777[b]	−3.487	−0.1046[b]	0.0242[a]	−0.0804[b]	−0.0818[b]
African-American	0.5563[b]	2.753	0.1823	0.983	0.1635[b]	−0.0159	0.1476[a]	0.1752[*]
Hispanic	−0.1686	−0.742	0.0413	0.242	−0.0496	−0.0036	−0.0532	−0.0491
Asian-American	0.5560[b]	2.990	−0.3022	−1.270	0.1634[b]	0.0263	0.1897[b]	0.2344[b]
Real estate as second career	−0.6149[b]	−3.165	−0.0808	−0.407	−0.1807[b]	0.0070	−0.1737[b]	−0.2109[b]
ln(Sales staff size)	−0.3659[b]	−15.965	−0.1365[b]	−6.540	−0.1076[b]	0.0119[b]	−0.0957[b]	–
Ln(Median metro house price in $000)	−0.0539	−0.543	–	–	−0.0159	–	−0.0159	–
Percent Chg. metro area employment	0.0021	0.058	–	–	0.0006	–	0.0006	–
Ln(Household income)	0.1402[a]	2.302	–	–	0.0412[a]	–	0.0412[a]	–
Associate broker	–	–	0.0530	0.518	–	−0.0046	−0.0046	−0.0046
Real estate listings webpage	–	–	0.2013[a]	2.445	–	−0.0175[a]	−0.0175[a]	−0.0176[a]
Full time	–	–	0.0697	0.559	–	−0.0061	−0.0061	−0.0061
Log likelihood		−1193.91						
Disturbance		0.37						

		correlation (ρ)							

correlation (ρ)								
Wald hypothesis test ($\rho = 0$; T-statistic)		5.35						
N		1,883						

[a]Statistically significant at the 0.05 level

[b]Statistically significant at the 0.01 level

The third column block of Table 5 contains the total effects of ownership and the 100 % payout contract. The total joint effect has direct and indirect components. The direct effect is through the ownership contract. One year of experience increases the probability of having both contract provisions by 1.88 %. The indirect impact from the 100 % payout contract reduces the joint effect by 0.51 %. The total effect of a year of experience is to raise the probability of having ownership and a 100 % payout contract by 1.37 %. Large firms have a 9.6 % lower probability of offering ownership and a 100 % contract. Total income and effectively wealth lead to a greater willingness to accept the contract.

The marginal effects are taken at the sample mean. The rightmost column of Table 5 shows the marginal effect for dummy variables. The step is from 0 to 1 rather than being evaluated at the mean. The total effect for a 0 to 1 step produces similar results to those in the remainder of Table 5. Women have an 8.2 % lower probability of having a 100 % contract and an ownership stake than men. African- and Asian- Americans have 17.5 % and 23.4 % higher probabilities of having ownership and a 100 % retention contract than non-Hispanic whites. The probability is 21.1 % lower among those who did not start their career in real estate. Marital status and schooling are not statistically significant.

The performance of agents conditional on at-work entrepreneurial contracts is in Table 6. The first block of results has as dependent variable the natural logarithm of gross revenue derived from real estate sales for the year. The second block reports net revenue after individual business expenses not paid by the firm. The third block has the business expenses as the dependent variable. It tests whether the entrepreneurial contracts shift expenses from the firm to the individual. All three regressions are statistically significant at the 0.01 level. These results are estimated using ordinary least squares.

Table 6 Performance conditional on employed small-business operator contract: OLS regression

Variable	Ln(Gross income)	Ln(Net income)	Ln(Business expenses)

	Coeff.	T-Ratio	Coeff.	T-Ratio	Coeff.	T-Ratio
Constant	8.8101[b]	25.883	8.3936[b]	24.521	6.3123[**]	13.271
Schooling	0.0043	0.369	−0.0009	−0.079	0.0350[a]	2.154
Experience	0.1003[b]	13.907	0.0879[b]	12.114	0.0590[b]	5.844
Experience squared	−0.0022[b]	−10.652	−0.0018[b]	−8.847	−0.0013[b]	−4.642
Married	0.1271[a]	2.545	0.1649[b]	3.284	0.2363[b]	3.377
Female	−0.1713[b]	−3.721	−0.1741[b]	−3.761	−0.1314[a]	−2.040
Black	−0.2889[a]	−2.535	−0.2021	−1.764	−0.4492[b]	−2.849
Hispanic	−0.1494	−1.358	−0.1062	−0.960	−0.0361	−0.237
Asian	0.0360	0.294	−0.0216	−0.176	−0.0691	−0.405
Real estate as second career	−0.1490	−1.221	−0.1772	−1.443	−0.0815	−0.480
Residential property investment	0.0416[b]	3.743	0.0423[b]	3.792	−0.0068	−0.432
Commercial property investment	0.0226	0.770	0.0059	0.199	0.0766	1.842
Profit sharing	−0.0181	−0.146	−0.0440	−0.352	0.1782	1.026
Independent franchise	0.1084[a]	2.280	0.0805	1.683	0.1947[b]	2.927
ln(Sales staff size)	0.0692[b]	5.349	0.0664[b]	5.108	0.1186[b]	6.564
Ln(Median metro house price in $000)	0.1428[b]	3.083	0.1604[b]	3.443	0.1750[b]	2.693
Percent Chg. metro area employment	0.0601[b]	3.503	0.0769[b]	4.455	0.0551[a]	2.283
Broker-owner	0.3121[b]	3.505	0.2294[b]	2.561	0.2855[a]	2.284
100 % payout contract	0.3928[b]	4.645	0.2515[b]	2.957	0.5555[b]	4.715
Broker-owner × 100 % payout contract	−0.2162	−1.441	−0.0533	−0.354	−0.0865	−0.413
Log likelihood		−2577.60		−2588.17		−3110.26
Chi square		441.99		374.68		190.82
Adjusted R-squared		0.20		0.17		0.10

N		1872		1872		1829

ªStatistically significant at the 0.05 level

ᵇStatistically significant at the 0.01 level

Owners generate 24.8 % more revenue than non-owners. Those on 100 % payout contracts earn 32.6 % more than those splitting revenue with the firm.[13] After expenses and taxes, the additional income is 31.2 % and 39.3 % higher for owners and 100 % contracts. In Table 2, a univariate comparison reveals a 42 % higher net income for owners and 45 % more for 100 % payout contract agents. Employed small-business operators have almost 50 % more experience and two to three times investments in properties. These operators possess unobservable talents based on their different profile. From Table 2, 42.5 % of 100 % payout contract agents are owners. Further, 48.2 % of owners are on 100 % contracts. The least-squares regression coefficients are likely to be biased. Sample selection regressions are conducted based on the bivariate probit in Table 5.

Table 7 reports performance conditional on selecting the employed small business operator contract. The two contract variables for ownership and a 100 % payout contract are included in the regression as independent dummy variables along with their self-selection conditional probabilities. There are four contract variables for whether an agent has 100 % retention, ownership in the firm and the self-selection conditional probabilities of each. There is also an interaction variable for the 100 % payout contract and ownership.

Table 7 Performance conditional on employed small-business operator contract: sample selection regression

Variable	Ln(Gross income)		Ln(Net income)		Ln(Business expenses)	
	Coeff.	T-Ratio	Coeff.	T-Ratio	Coeff.	T-Ratio
Constant	8.7129ᵇ	23.083	8.3092ᵇ	21.862	5.9918ᵇ	11.348
Schooling	−0.0057	−0.461	−0.0075	−0.602	0.0397ª	2.290
Experience	0.1045ᵇ	11.565	0.0902ᵇ	9.912	0.0488ᵇ	3.852
Experience squared	−0.0023ᵇ	−10.457	−0.0019ᵇ	−8.581	−0.0012ᵇ	−3.944
Married	0.1559ᵇ	2.978	0.1834ᵇ	3.477	0.2128ᵇ	2.895
Female	−0.1829ᵇ	−3.272	−0.1786ᵇ	−3.174	−0.0692	−0.881
Black	−0.3512ᵇ	−2.998	−0.2470ª	−2.094	−0.4902ᵇ	−3.016

Hispanic	−0.1133	−1.025	−0.0808	−0.726	−0.0245	−0.160
Asian	−0.1119	−0.842	−0.1215	−0.908	−0.0438	−0.236
Real estate as second career	−0.0427	−0.333	−0.1022	−0.793	−0.0413	−0.231
Residential property investment	0.0408[b]	3.673	0.0417[b]	3.732	−0.0085	−0.535
Commercial property investment	0.0184	0.628	0.0029	0.098	0.0749	1.799
Profit sharing	−0.0086	−0.069	−0.0378	−0.302	0.1725	0.993
Independent franchise	0.1261[b]	2.636	0.0928	1.927	0.1987[b]	2.963
ln(Sales staff size)	0.0914[b]	4.108	0.0835[b]	3.727	0.1524[b]	4.882
Ln(Median metro house price in $000)	0.1509[b]	3.258	0.1660[b]	3.559	0.1759[b]	2.702
Percent Chg. metro area employment	0.0590[b]	3.444	0.0761[b]	4.408	0.0540[*]	2.235
Broker-owner	1.1825[b]	3.768	0.8367[b]	2.648	0.4929	1.122
100 % payout contract	−0.7526	−1.204	−0.4836	−0.768	1.4486	1.661
Broker-owner × 100 % payout contract	−0.1921	−1.025	−0.0490	−0.259	−0.3077	−1.171
Lambda (Broker-owner)	−0.3765[a]	−2.518	−0.2677	−1.779	−0.1805	−0.864
Lambda (100 % payout contract)	0.5305	1.710	0.3373	1.080	−0.4710	−1.087
Log likelihood		−2562.00		−2574.98		−3098.19
Chi square		473.19		401.06		214.96
Adjusted R-squared		0.21		0.17		0.10
N		1872		1872		1829

[a]Statistically significant at the 0.05 level

[b]Statistically significant at the 0.01 level

The condition and performance is on having ownership and the 100 % payout contract. If ownership conveys additional productivity and performance, the agent has higher gross and net revenue. The 100 % contract defeats these within-firm effects even as the employed small-business operator remains an employee. The agent has a reduced incentive to offer referrals,

perform joint work on listings and sales, and engage in teamwork that leads to additional revenue. Gross revenue of owners is 118.3 % higher than non-owners on a split commission. Net revenue after business expenses is 83.7 % higher for at-work entrepreneurs. The main effect comes from having ownership.

Conditional on ownership, the 100 % payout contract does not lead to higher performance. The coefficient is negative although statistically insignificant. That agent is becomes more of a conventional small business operator inside the firm. Because the firm offers limited or no support, there is no sharing of leads and teamwork. The agent is dissipating energy on activities where there is no comparative advantage.

Unobservable or latent effects are captured by the conditional probabilities from the bivariate probit. The gross income of owners is lower than that of non-owners with equivalent characteristics. The negative coefficient implies that the gross income of owners would be higher were it not for the selection process that determines ownership. For the 100 % payout contract agents the sample selection coefficient in the gross income equation is positive but statistically insignificant.

The effect of the 100 % payout contract and ownership on business expenses is reported in the last two columns of Table 7. Employed small-business operators do not have business expenses different from other agents. The firm is not shifting expenses to any contract class of employee.

Performance is improved at larger firms and where the local economy is stronger. Gross revenues rise 0.091 % per 1 % increase in firm size. A 1 % increase in local house prices raises agent revenue by 0.15 %. A 1 % increase in employment increases revenue by 5.9 %.

Table 7 reports the effects of demographics and skills. A year of experience raises the agent's gross revenue generated by 10.5 %, and net revenue after expenses rises by 9.0 %. Women and African-Americans have lower gross and net revenue as compared with males and non-Hispanic whites. Each added residential property owned leads to a 4.1 % increase in gross and net revenue.

Concluding Remarks

Nominally an employee, the employed small-business operator is on the payroll, billing clients and sharing the revenue with the firm. The firm is providing overhead and infrastructure including tangible assets. At the limit the contract gives 100 % of individual revenue in exchange for paying rent to the firm. The employed entrepreneur can hold ownership in the firm itself.

The employed small-business operator has higher household income. Evidence of a preference for autonomy and flexibility is also present. Individuals with an ownership stake work at smaller firms. Those who take on these risks are more experienced and less likely to have started a first career elsewhere. An ownership stake increases productivity whether defined in gross or net

income terms. Conversely, the 100 % payout contract offers no gain in productivity conditional on ownership. Employed small business operators on the 100 % payout contract are dissipating resources by performing all entrepreneurial tasks. Preferences for being one's own boss lead to diminished performance.

The results are consistent across classifications. A strict entrepreneurial contract allowing an agent to retain all revenue in exchange for periodic fixed rental fees is not incrementally productive. A sharing contract leads to higher individual output and revenue.

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Footnotes

1. As in Lazear (*2005*) this entrepreneur has balanced skills. In the 100 % payout case there is a loss of focus from having to manage staff, diverting activity from revenue generation.

2. De Nardi et al. (*2007*) provide evidence on the extent of self-employed entrepreneurial activity. At salons, it is typical for the firm to own the facility and the stylist either to rent the station or split revenue proceeds. For taxis, one entrepreneur owns the cab while renting it to another who drives it.

3. The Medical Group Management Association (MGMA) *Physician Placement Starting Salary Survey: 2010 Report Based on 2009 Data* reports these results. The doctors are paid on a productivity basis analogous to lawyers and other professionals. Of the remaining one-third of medical graduates from residencies, most work on salary or are engaged in research. Fewer than 10 % of graduates from residencies are working at conventional small business practices.

4. Under the American Bar Association's Model Rule 5.4, law firms are prohibited from selling equity shares to non-lawyers. Law firms are usually structured as professional corporations with shareholders with only attorneys being owners. The rationale is an ethical restriction prohibiting legal fee sharing. Similar rules occur in accounting firms. The tight-knit nature of these firms gives employed small-business operators incentives to hold stakes as opposed to outsiders even when there are no explicit prohibitions.

5. See, http://www.law.yale.edu/documents/pdf/CDO_Public/cdo-billable_hour.pdf. To generate 44 billable hours a week for 50 weeks of work, the associate is expected to be at work for 60. The remaining hours are spent in meetings, conferences, development or in non-billable time.

6. Blau (*1987*) and Parker (*2004*) show that self-employment has been rising in the United States and United Kingdom since 1980, after secular declines associated with decreasing relative employment in agriculture. The phenomenon is not universal in developed countries. In Japan self-employment has been secularly declining, potentially attributable to an aging society (Genda and Kambayashi (*2002*)).

7. Data are from the Medical Group Management Association. They find that the greater the group practice's revenue derived from fixed-payment or capitation fees, the more the tendency to pay salaries as opposed to revenue splits. Incentives shift away from individual at-service billing to time spent with the patient.

8. The desire to mitigate risk is a motivation for the at-work entrepreneurial contract. Caliendo et al. (*2009*) examine the role of risk aversion in becoming self-employed. Risk is less of a factor if the person was unemployed or not in the labor force. The positive correlation remains even after accounting for risk aversion (Kan and Tsai (*2006*)).

9. The gross revenue or dollar commission generated from a sale is based upon the commission rate charged. The commission is typically split between the listing and selling agents, and the additional split occurs when the agents split their portions of the commissions with their respective firms. The commission rate is first established by the listing agent but may be

renegotiated prior to the final sale. A buyer agent may receive the commission instead of a selling agent in the event that the buyer has entered into a contractual arrangement with an agent.

10. The term agent is used generically to describe licensees in real estate. In practice there are two types of licensees, agents and brokers, depending on state regulations. Agents are not permitted to sell client properties on their own without oversight of brokers. A broker has a higher tier of licensing requirement.

11. The NAR survey was conducted in spring 2008; the response rate was 7.7 % or about 10,000 observations. The survey includes other real estate professionals such as appraisers and property managers. The final sample for this study is limited to agents who responded as primarily in residential real estate brokerage and paid on commission. This includes agents who receive at least 50 % of income from residential real estate and who receive at least a 50 % split with their firm. By doing so, the same becomes more homogeneous and eliminates from the sample those with virtually no real estate experience.

12. The marginal effects of the coefficients from the probit equations in Tables 3 and 4 are calculated at the means. The exception is the dummy variables where the marginal effect is estimated by the step from 0 to 1.

13. The marginal effect for dummy variables in the logarithmic specification of the dependent variable is approximated by the coefficient in the table. The exact marginal effect is $(e^x - 1) *$ 100 where x is the dummy coefficient.