# DOES THE OWNERS' GENDERS IMPACT THEIR BUSINESS' ANNUAL PAYROLL?

*Abstract*

This paper will explore the impact of business owners' gender and their gender-owned business type on their business' annual payroll. It will estimate this impact through an OLS regression controlling for both owners' characteristics and their businesses' characteristics using the public use microdata sample (PUMS) data from the 2007 Survey of Business Owners and Self-Employed Persons (SBO). The results, when tested independently, demonstrate that the estimates of $\beta_1$ and $\beta_2$ are statistically far from 0 at the 1% level. The results also demonstrate a statistically significant affect on annual payroll when businesses are equally male/female-owned and male-owned. This paper also encourages others to further examine gender differences in entrepreneurship.

Amy Sandoval

Texas A&M University

## I. Introduction

According to the Bureau of Labor Statistics, wages and salaries per hour worked accounted for 70.4 percent of employer costs for employee compensation in June 2011. Besides wages and salaries, benefit plans are also a factor that drives up payroll costs. The Bureau of Labor Statistics states that the employer portion of insurance, employer contributions to pensions, and other retirement plans make up 29.6 percent of employer costs for employee compensation. This paper will use the public use microdata sample (PUMS) data from the 2007 Survey of Business Owners and Self-Employed Persons (SBO) to explore factors that contribute to businesses' payroll. These factors consist of the characteristics of owners and of their businesses the U.S. Census Bureau collects. This paper will focus on the characteristics of business owners and businesses that stated only having two owners and who's both owners have 50% ownership of their business.

To further explore the variation between a businesses' payroll and revenue, Graph 1 demonstrates the scatter plot correlation of payroll and revenue for all firms. Furthermore, the PUMS data table estimates the cumulative female-owned businesses' revenue and payroll to be $1,195,409,097 and $214,671,261 respectively. Male-owned businesses had a cumulative revenue and payroll of $8,476,983,539 and $1,510,617,296, respectively as well. It also estimates equally male/female-owned businesses' revenue as $1,275,146,944 and payroll as $215,515,521. Using these estimates, the cumulative payroll percentage of revenue makes up 17.96%, 17.82%, 16.90% for female-owned businesses, male-owned business, and equally male/female-owned businesses respectively. This demonstrates payroll taking up 1% less of revenue for equally male/female-owned businesses compared to male-owned and female-owned businesses. These results raise the following question: does the genders of the owners impact the amount a business spends on payroll?

To further explore the payroll and revenue differences of equally male/female-owned, male-owned and female-owned, Graphs 2-5 graphically demonstrate the payroll and revenue variation based on the genders of owners 1 and owner 2. Businesses with a female owner 1 and male owner 2 demonstrate graphically a steeper correlation between businesses' payrolls and revenues, demonstrated in Graph 5. To expand more on the difference in payroll due to the genders of owner 1 and owner 2, Table 1 demonstrates a 1% decrease in the mean percentage of revenue spent on payroll on businesses who had a female secondary owner. To explore this

variation in businesses' annual payroll, this paper will explore how the genders of owners in a two owner equally-owned business impact their business' annual payroll. It will observe the impact of the gender of owner 1 and owner 2 on their business' annual payroll, captured by $\beta_1$ and $\beta_2$. This paper hypothesizes that $\beta_1$ and $\beta_2$ are not zero through a linear regression using the PUMS data from the 2007 Survey of Business Owners and Self-Employed Persons (SBO).

## II. Literature Review

Although the literature exploring gender differences in entrepreneurship and ownership is limited due it being a topic recently explored in economics, the issue of gender and entrepreneurship has been well recognized. The existing literature mentions the challenge of addressing this difference. Fisher states that it has been an obstacle understanding the nature and implications of issues related to sex, gender, and entrepreneurship due to the lack integrative frameworks (1993). Although gender differences in entrepreneurship are difficult to address, this difference is important to explore due to the importance of entrepreneurship on the economy. King states that entrepreneurship is a contributing factor to economic growth and poverty alleviation (1999). Therefore, it is important to explore gender limitations and gender differences entrepreneurs face. Bonte highlights the relevance of gender differences in competitiveness in the gender gap in latent and nascent entrepreneurship (2012). Their finding suggests that competitively inclined and risk-taking individuals are more likely to be latent or nascent entrepreneurs. Moreover, their results demonstrate that women are less competitively inclined than men and are also less willing to take the risk of starting a new business in almost all countries sampled. Although Bonte explores competitiveness as a limiting aspect of the entry of female entrepreneurship, the study does not explore the determinants of gender differences in competitiveness. To add to the limitations female entrepreneurs face, Khaleque explores the finance limitations of female entrepreneurs (2018). This paper emphases the financial constraints faced by women entrepreneurs and the concurrent effects on business turnovers. The results of this study demonstrate, controlling for characteristics of the firms, the characteristics of the women entrepreneurs, and costs, a 1% increase in availability of credit increases around 6% of monthly sales. This further highlights the credit constraints women entrepreneurs face limiting their business performance. To further explore the gender differences in entrepreneurship, this paper will explore the gender differences in owners impacting their business' annual payroll.

## III. Model and Data Specifications

The following linear regression will model the causal impact of the genders of owner 1 and owner 2 on annual payroll:

$$
\begin{aligned}
(1)\ \boldsymbol{AnnualPayroll_i} &= \boldsymbol{\beta_0} + \boldsymbol{\beta_1 Owner1Gender_i} + \boldsymbol{\beta_2 Owner2Gender_i} \\
&+ \boldsymbol{\beta_3 HusbandWifeBusiness_i} + \boldsymbol{\beta_4 HealthInsranceBenefit_i} \\
&+ \boldsymbol{\beta_5 RetirementBenefit_i} + \boldsymbol{\beta_6 ProfitShareBenefit_i} \\
&+ \boldsymbol{\beta_7 PaidHoildays_i} + \boldsymbol{\beta_8 ESales_i} + \boldsymbol{\beta_9 Exports_i} + \boldsymbol{\beta_{10} TwoOwners_i} \\
&+ \boldsymbol{\beta_{11} BachelorOwner1_i} + \boldsymbol{\beta_{12} BachelorOwner2_i} \\
&+ \boldsymbol{\beta_{13} FullTimeEmployees_i} + \boldsymbol{\beta_{14} PartTimeEmployees_i} \\
&+ \boldsymbol{\beta_{15} EstabEmployment_i} + \boldsymbol{\beta_{16} EstabRevenue_i} \\
&+ \boldsymbol{\beta_{17} Owner150\%_i} + \boldsymbol{\beta_{18} Owner250\%_i} + \boldsymbol{\beta_{19} Owner1HoursWorking_i} \\
&+ \boldsymbol{\beta_{20} Owner1HoursWorking_i} + \boldsymbol{\mu_i}
\end{aligned}
$$

Model (1) demonstrates the annual effect of the genders of owner 1 and owner 2, captured by $\beta_1$ and $\beta_2$, on annual payroll controlling for characteristics of the business and of the primary and secondary owners. The regression's dependent variable is the annual payroll of a business, an integer ranging from $0 to $1,500,000. The independent variables are the genders of owners 1 and owners 2; they are a dummy variable representing 1 if male, 0 if female and "." if not reported. To observe the impact of the gender of owners on their business' annual payroll with little potential omitted variable biases as possible variables are added to the regression as controls.

The justification for these controls are as followed. To control for joint ownership of husband and wife which could influence payroll by owners' wages going to the same household, the dummy variable of Husband/Wife Business (0 = No, 1= Yes and "." if not reported) was added. To control for employee benefits that could make up most of payroll, dummy variables for whether the businesses offered health insurance, retirement benefits, profit share benefits, and paid holidays (0 = No, 1= Yes and "." if not reported) was added. To control for the size of the business that could also have a positive affect on payroll costs, dummy variables for different percentage ranges of Ecommerce sales as % of total sales (ESales) and Exports as % of total sales (Exports), and integer variables for Establishment Employment (EstabEmployment) and Establishment Revenue (EstabRevenue) were added as well. To control for other business'

characteristics that could have a positive influence on payroll, dummy variables for the following were added: whether the business is a two-owner business or not (TwoOwner), whether a business used full-time employees (FullTimeEmployees) and part-time employees (PartTimeEmployees). To control for owner characteristics that could increase payroll due to education usually has a positive increase in wages, dummy variables for whether owner 1 had a bachelor (BachelorOwner1) and whether Owner 2 has a bachelor's degree (BachelorOwner2) were included. To control for equal ownership, the variables Owner150% and Owner250% were included to control for owner 1 and owner 2's both having 50% ownership. Lastly, to control for the amount spent working of each owner that would explain their respective salaries' impact on payroll, a dummy variable ranging from 0 to 5 to represent a range of number of hours worked or managed the business named Owner1HoursWorking and Owner2HoursWorking was also included. Furthermore, the summary statistics of the variables used in the Model (1) can be seen in Table 2.

The following linear regression will model the causal impact of equally male/female-owned, male-owned, and female-owned on annual payroll:

$$
\begin{aligned}
(2)\ \boldsymbol{AnnualPayroll_i} &= \boldsymbol{\beta_0} + \boldsymbol{\beta_1 BusinessGenderOwnedType_i} + \boldsymbol{\beta_2 HusbandWifeBusiness_i} \\
&+ \boldsymbol{\beta_3 HealthInsranceBenefit_i} + \boldsymbol{\beta_4 RetirementBenefit_i} \\
&+ \boldsymbol{\beta_5 ProfitShareBenefit_i} + \boldsymbol{\beta_6 PaidHoildays_i} + \boldsymbol{\beta_7 ESales_i} \\
&+ \boldsymbol{\beta_8 Exports_i} + \boldsymbol{\beta_9 TwoOwners_i} + \boldsymbol{\beta_{10} BachelorOwner1_i} \\
&+ \boldsymbol{\beta_{11} BachelorOwner2_i} + \boldsymbol{\beta_{12} FullTimeEmployees_i} \\
&+ \boldsymbol{\beta_{13} PartTimeEmployees_i} + \boldsymbol{\beta_{14} EstabEmployment_i} \\
&+ \boldsymbol{\beta_{15} EstabRevenue_i} + \boldsymbol{\beta_{16} Owner150\%_i} + \boldsymbol{\beta_{17} Owner250\%_i} \\
&+ \boldsymbol{\beta_{18} Owner1HoursWorking_i} + \boldsymbol{\beta_{19} Owner1HoursWorking_i} + \boldsymbol{\mu_i}
\end{aligned}
$$

Model (2) demonstrates the annual effect of equally male/female-owned, male-owned, and female-owned, captured by $\beta_1$, on annual payroll controlling for characteristics of the business and of the primary and secondary owners as in Model (1). The regression's dependent variable is the annual payroll of a business which is an integer ranging from $0 to $1,500,000. The independent variable is the business' gender-owned business type; they are a dummy variable representing 1 if male/female-owned, female-owned, female/male-owned and male-

owned for Table 4, Table 5, Table 6, and Table 7 respectively, 0 if otherwise and "." if not reported. To observe the impact of the businesses' gender-owned business type on their business' annual payroll with little potential omitted variable biases as possible, same variables as in Model (1) are added to the regression as controls

IV. Results

The results of this regression using the 2007 SBO PUMS data in Model (1) are shown in Table 3. This table presents the effects of the gender of a business' owner on their business' annual payroll. Column 1 demonstrates the estimated coefficients of the regression of Model (1) restricted. Column 2 demonstrates the estimated coefficients of the regression of Model (1) unrestricted. The increase in r-squared from restricted Model (1) (.0060) to unrestricted Model (1) (.8299) demonstrates that the controls added decrease the difference between the true $\beta_1$ and the estimated $\beta_1$ and explains the variation in payroll well. Although the regression variables explain 82.99% of the variation in the samples' annual payroll, omitted variable bias still exists and should be kept in mind when interpreting the estimates in Table 3.

Table 3's results demonstrate that, controlling for characteristics of the owners, business, and has a male owner 2, the difference between a male owner 1 and a female owner 1 is about $84, captured by $\beta_1$ . This means that keeping other variables constant, a male owner 1 will increase annual payroll by about $84, and a female owner 1 will decrease annual payroll by the amount about. The results also demonstrate that, controlling of the other variables in the regression, the difference between a male owner 2 and a female owner 2 is about $111, captured by $\beta_2$. This means that keeping other variables constant, a male owner 2 will increase annual payroll by about $111, while a female owner 2 will decrease annual payroll by $111 as well. Both estimates of $\beta_1$ and $\beta_2$ are statistically significant at the 1% level. Although these estimates are statistically significant in Table 3, the following demonstrates testing the null hypothesis, $\beta_1 = \beta_2$ .

```
. test male1=male2

( 1)  male1 - male2 = 0

       F(  1, 31947) =    0.89
            Prob > F =    0.3445
```

Due to these results, the null hypothesis of $\beta_1 = \beta_2$ cannot be rejected. This demonstrates that the likelihood of a type I error is 34.45% and cannot reject the null at any level of significance. This difference in significance can be interpreted as individually the gender of owner 1 and owner 2 explains the variation of businesses' annual payroll well, but when tested together they are highly correlated. The following will test for $\beta_1 = 0$ and $\beta_2 = 0$ and find that we can reject the null of $\beta_1 = 0$ and $\beta_2 = 0$ independently at the 1% level.

```
 test male1=0

( 1)  male1 = 0

      F(  1, 31947) =   11.52
           Prob > F =    0.0007

 test male2=0

( 1)  male2 = 0

      F(  1, 31947) =   29.18
           Prob > F =    0.0000
```

The results of Model (2) support Model (1) results. Table 4 will demonstrate the results for an equally owned female/male-owned business with a male owner 1 and female owner 2's impact on their business' annual payroll. The results demonstrate that this gender-owned business type of business decreases payroll by about $91, statistically significant at the 1% level. The following will test the null hypothesis and demonstrates that we can reject the null that $\beta_1 = 0$ at the 1% level. This will demonstrate that the difference between an equally owned female/male-owned business with a male owner 1 and female owner 2 and other gender-owned business types is not 0.

```
. test malefemale

 ( 1)  malefemale = 0

       F(  1, 31948) =   18.69
            Prob > F =    0.0000
```

Table 5 will demonstrate the results for an equally owned female-owned business with a female owner 1 and female owner 2's impact on their business' annual payroll. The results demonstrate that this type of business decreases payroll by about $56 but is not statistically

significant at any level. The following will test the null hypothesis and demonstrates that we cannot reject the null that $\beta_1 = 0$ at any level.

```
. test femalefemale=0

 ( 1)  femalefemale = 0

       F(  1, 31948) =    1.83
            Prob > F =    0.1758
```

Table 6 will demonstrate the results for an equally owned female/male-owned business with a female owner 1 and male owner 2's impact on their business' annual payroll. The results demonstrate that this type of business decreases payroll by about $48 and is statistically significant at the 10% level. The following tests the null hypothesis and demonstrates that we can reject the null that $\beta_1 = 0$ at the 10% level. This will demonstrate that the difference between an equally female-owned business with a female owner 1 and female owner 2 and other gender-owned business types is not 0.

```
. test femalemale=0

 ( 1)  femalemale = 0

       F(  1, 31948) =    2.94
            Prob > F =    0.0867
```

Table 7 will demonstrate the results for an equally male-owned business with a male owner 1 and male owner 2's impact on their business' annual payroll. The results demonstrate that this type of business increase payroll by about $145 and is statistically significant at the 1% level. The following tests the null hypothesis and demonstrates that we can reject the null that $\beta_1 = 0$ at the 1% level. This will demonstrate that the difference between an equally male-owned business with a male owner 1 and male owner 2 and other gender-owned business types is not 0.

```
. test malemale

 ( 1)  malemale = 0

       F(  1, 31948) =   43.70
            Prob > F =    0.0000
```

## V. Conclusion

This study explored owners' gender on their businesses' annual payroll. Due to the high correlation of the genders of owner 1 and owner 2, the null hypothesis of $\beta_1 = \beta_2$ could not be

reject. However, when testing independently, $\beta_1$ =0 and $\beta_2$ =0 are statistically far from 0 at the 1% level. The results from Model (2) demonstrated a statistically significant impact on annual payroll when businesses are equally male/female-owned and male-owned. Although these estimates are statistically significant, some variables are not controlled for. These variables are the number of full time and part-time employees a business had, whether the business offered maternity leave, the salaries and/or wage rate of the employees in the business, and the incomes of the owners. Not controlling for these variables gives room for the potential of omitted variable bias, and the results may overestimate the impact of the owners' gender and business' gender-owned business type on annual payroll. Lastly, the gender difference in entrepreneurship on businesses' outcomes and costs should be further explored. Incentives should emerge to reduce this difference and encourage gender equality in entrepreneurship.

## VI. References


"EMPLOYER COSTS FOR EMPLOYEE COMPENSATION – JUNE 2011." Bureau of Labor Statistics , U.S. Department of Labor, 2011, www.bls.gov/news.release/archives/ecec_09082011.pdf.

Bonte, Werner, and Monika Piegeler. "Gender Gap in Latent and Nascent Entrepreneurship: Driven by Competitiveness." *Small Business Economics*, vol. 41, no. 4, 2013, pp. 961–987.

Fischer, Eileen M., et al. "A theoretical overview and extension of research on sex, gender, and entrepreneurship." *Journal of Business Venturing*, vol. 8, 1993, pp. 151–168.

Khaleque, Abdul. "Performance of Women Entrepreneurs: Does Access to Finance Really Matter?" *Eurasian Journal of Business and Economics*. vol. 11, no. 21, 2018, pp. 23–48.

King, Kennth, and Simon A. McGrath. *Enterprise in Africa: Between poverty and growth. London: Intermediate Technology*, London, 1999. https://doi.org/10.3362/9781780440774

Survey of Business Owners and Self-Employed Persons (2007 Public Use Microdata Sample (PUMS) Special Release). United States Census Bureau. Web. 27 April 2019. https://www.census.gov/data/datasets/2007/econ/sbo/2007-sbo-pums.html


**Word Count: 2,503**

**Table 1**

**Summary Statistics –Payroll % of Revenue, Payroll and Revenue by Owners' Gender**

| | Observations | Mean | Standard Deviation | Min | Max |
|---|---|---|---|---|---|
| **Owner 1: Male Owner 2: Female** | | | | | |
| **Payroll % of Revenue** | 112,037 | .2269684 | .7449338 | 0 | 190 |
| **Payroll** | 114,198 | 288.7784 | 1135.431 | 0 | 190000 |
| **Revenue** | 114,198 | 1512.197 | 5721.436 | 0 | 500000 |
| **Owner 1: Male Owner 2: Male** | | | | | |
| **Payroll % of Revenue** | 54,482 | .2321243 | 1.106621 | 0 | 240 |
| **Payroll** | 55,630 | 690.7388 | 3531.157 | 0 | 580000 |
| **Revenue** | 55,630 | 3527.941 | 15770.61 | 0 | 1200000 |
| **Owner 1: Female Owner 2: Female** | | | | | |
| **Payroll % of Revenue** | 7,090 | .2227284 | .3374614 | 0 | 19 |
| **Payroll** | 30,030 | 236.0676 | 1432.198 | 0 | 150000 |
| **Revenue** | 7,460 | 949.1287 | 4242.195 | 0 | 200000 |
| **Owner 1: Female Owner 2: Male** | | | | | |
| **Payroll % of Revenue** | 21,570 | .2321243 | 1.106621 | 0 | 14.2 |
| **Payroll** | 22,570 | 690.7288 | 3531.157 | 0 | 150000 |
| **Revenue** | 22,570 | 3527.941 | 15770.61 | 0 | 19000000 |

**Table 2**

**Regression Variables Summary Statistics**

| | Observations | Mean | Standard Deviation | Min | Max |
|---|---|---|---|---|---|
| **Annual Payroll** | 1,048,575 | 572.1481 | 3612.481.28 | 0 | 1,500,000 |
| **Owner 2: Female** | 558,897 | .4695463 | .4990722 | 0 | 1 |
| **Husband Wife Business** | 647,132 | .1826474 | .3863775 | 0 | 1 |
| **Health Insurance Benefit** | 767,400 | .4569625 | .4981447 | 0 | 1 |
| **Retirement Benefit** | 767,400 | .2616849 | .4395522 | 0 | 1 |
| **Profit Share Benefits** | 767,400 | .0736448 | .2611921 | 0 | 1 |
| **Paid Holidays** | 767,400 | .4991491 | .4999996 | 0 | 1 |
| **Ecommerce sales as % of total sales** | 328,636 | .5271973 | 1.437987 | 0 | 7 |
| **Exports as % of total sales** | 1,013,981 | .1847165 | .8449467 | 0 | 7 |
| **Two Owners** | 788,481 | .3639416 | .4811324 | 0 | 1 |
| **Owner 1: Bachelor's Degree** | 990,116 | .217721 | .4126969 | 0 | 1 |
| **Owner 2: Bachelor's Degree** | 655,419 | .1913047 | .3933287 | 0 | 1 |
| **Owner 1: Male** | 1,048,575 | .8019379 | .3985394 | 0 | 1 |
| **Full time employees** | 767,043 | .6981955 | .4590412 | 0 | 1 |
| **Part time employees** | 766,419 | .5299334 | .4991035 | 0 | 1 |
| **Establishment Employment** | 1,048,575 | 14.84409 | 92.75713 | 0 | 35,000 |
| **Establishment Revenue** | 1,048,575 | 2836.071 | 22590.28 | 0 | 13,000,000 |
| **Owner 1 Percentage – 50%** | 1,048,575 | .2875016 | .4525976 | 0 | 1 |
| **Owner 2 Percentage – 50%** | 1,048,575 | .2764771 | .4472558 | 0 | 1 |
| **Owner 1 – Hours spent working** | 736,121 | 3.175153 | 1.505421 | 0 | 5 |
| **Owner 2 – Hours spent working** | 399,707 | 2.202278 | 1.650917 | 0 | 5 |

**Table 3**
**Regression Demonstrating the Effect of Owners' Gender on Annual Payroll**
Dependent Variable: Annual Payroll

| | 1<br>Model (1) Restricted | 2<br>Model (1) Unrestricted) |
|---|---|---|
| **Owner 1: Male** | 470.5294*** (14.89903) | 83.73342*** (26.67388) |
| **Owner 2: Male** | 633.3157*** (11.56919) | 110.573*** (20.47109) |
| **Husband/Wife Business** | | -12.47354 (12.76337) |
| **Health Insurance Benefit** | | 79.39638*** (25.2099) |
| **Retirement Benefit** | | 283.2942*** (22.55661) |
| **Profit Share Benefits** | | 492.3548*** (29.448083) |
| **Paid Holidays** | | 48.7612* (27.43932) |
| **Ecommerce sales as % of total sales** | | 1.318338 (4.448083) |
| **Exports as % of total sales** | | 53.35109*** (6.263913) |
| **Two Owners** | | -104.9628*** (25.47798) |
| **Owner 1: Bachelor's Degree** | | 7.910382 (19.55586) |
| **Owner 2: Bachelor's Degree** | | 39.17079** (19.54657) |
| **Full time employees** | | -82.58738*** (31.41375) |
| **Part time employees** | | -43.70862** (21.40071) |
| **Establishment Employment** | | 27.88623*** (.0858494) |
| **Establishment Revenue** | | .0241627*** (.0003807) |
| **Owner 1 Percentage – 50%** | | -251.5165*** (63.39172) |
| **Owner 2 Percentage – 50%** | | 205.0781*** (67.60753) |
| **Owner 1 – Hours spent working** | | .6775984 (6.508638) |
| **Owner 2 – Hours spent working** | | 21.04917*** (5.967487) |
| **Intercept** | -8.602343 (15.81488) | -146.3963*** (43.37776) |
| **Observations** | 558,897 | 31,968 |
| **R-Squared** | .0060 | .8299 |

*Significant at the 10% level **Significant at the 5% level ***Significant at the 1% level. (Standard errors are shown in parentheses)