

Experimental Estimates of Wages and Gross Output by Business Size and Industry, 2002-2012

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ABSTRACT

This paper presents experimental estimates of wages and gross output by business size and industry sector for 2002-2012. We find small businesses, those employing less than 100 workers, experienced relatively slower growth between 2002 and 2012 for both wages and gross output compared to larger businesses. Very small businesses, those with less than 20 employees, experienced the slowest growth across all business sizes for both wages and gross output (2.3% and 3.2%, respectively). Additionally, the industry composition for small businesses was different than the industry composition for medium and large businesses. The industry with the greatest share of wages for very small and small businesses in 2012 was professional, scientific, and technical services (17% and 14%, respectively), whereas manufacturing had the greatest share for medium businesses (16%) and health care and social assistance had the greatest share for large businesses (14%). These estimates provide new and important information to policymakers and researchers to better understand the role of small, medium, and large businesses in the US economy.

JEL codes: E01, A10

Keywords: Small businesses; Large businesses; Gross output; Wages

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INTRODUCTION

Statistics by business size provide policymakers and researchers with vital tools to understand the role of small, medium, and large business in the US economy. Survey of US Business (SUSB) data from Census Bureau show small businesses represent the majority of all businesses in the US and employ millions of Americans (US Census Bureau 2017a). Data from the Bureau of Labor Statistics (BLS) show small businesses sometimes have different responses than larger businesses in periods of economic change, notably the disproportionately large loss of jobs in smaller firms during the Great Recession (Helfand 2010). However, many economic statistics are not available by size. This paper addresses the need for additional economic statistics by business size with new experimental estimates of gross output and wages by size and industry from 2002 to 2012.

Research on business size often uses number of employees to categorize businesses as either large or small. The BLS uses businesses with at least 250 employees as its largest category of data by business size in its Business Employment Dynamics data series (US Department of Labor 2018). The Small Business Administration (SBA) uses 500 employees as the threshold to determine if a business is large or small in most cases, though it has also used revenue to classify businesses by size for certain capital-intensive industries that have few employees and high revenue, such as farming and construction (Kobe 2012; US Small Business Administration 2018). The SBA prepares estimates of gross domestic product (GDP) for small and large businesses every few years through the release of working papers on their website (Popkin 2001; Kobe 2002; Kobe 2007; Kobe 2012; Kobe and Schwinn 2017). They determined that small businesses represented the majority of US gross domestic product (GDP) up until 2002, at which point the small business share began to decline slowly to 44% of US GDP in 2014 (Kobe and

Schwinn 2017). The SBA attributes this decline to large businesses growing relatively faster than small businesses over the period.

Statistics Canada, the official statistical agency of Canada, produced estimates of GDP by business size for their economy in 2011 (Leung, Rispoli, and Chan 2012; Rispoli and Leung 2011). While they also classify businesses with at least 500 employees as large, businesses with 100-499 employees were classified as medium and businesses with less than 100 employees were small. They estimated that small and medium businesses accounted for 54% of the Canadian economy in 2005. When health and education were excluded due to substantial government ownership in Canada, small and medium businesses still accounted for 53% of the Canadian economy. As a comparison, the corresponding 2005 US private small business GDP figure estimated by the SBA was just under 46% (Kobe and Schwinn 2017).

Although there is a lack of consensus on how to define business sizes, large businesses are typically classified as businesses with 500 or more employees so this report follows that convention (Table 1). We also divide businesses with less than 500 employees into small and medium categories following Statistics Canada. Medium businesses are those with 100-499 employees and small businesses are those with less than 100 employees. To give finer detail and better insights into the industries driving small business growth, the small category is further broken into very small businesses (0-19 employees) and small businesses (20-99 employees).

METHODOLOGY

Data

The major data source used to calculate both wages and gross output is the Survey of US Businesses (SUSB) from the Census Bureau (US Census Bureau 2017a). The SUSB provides payroll annually by size and industry, plus corresponding receipts, shipments, and sales data

every five years. The data are available for about two dozen enterprise size classifications. The major advantage of the SUSB is the availability of data by enterprise size instead of establishment size. This means the SUSB can be used to categorize small establishments that are part of a larger chain as part of large businesses. The SUSB captures most US businesses, except government and some agricultural services. The SUSB sample includes businesses with one or more employee during the year. Enterprises with zero employees represent businesses with no employees in March of that year, but with one or more employees at some point during the year. Census Bureau's Nonemployer Statistics (NES) data by industry are used to capture receipts for businesses with no employees during the year (US Census Bureau 2017b). A similar data source is not needed for wages since non-employers receive proprietor's income, a category distinct from wages in BEA's national accounting framework.

Nominal wages and gross output by industry for 2002, 2007, and 2012 from the Bureau of Economic Analysis (BEA) are used as the US industry totals (US Bureau of Economic Analysis 2017a). The BEA defines wages as money paid in regular intervals to employees by employers and gross output as receipts plus other operating income and inventory change (US Bureau of Economic Analysis 2017b). Using the BEA wages and gross output values instead of the US totals in the SUSB and NES data ensure that the industry totals are consistent with the BEA national accounting methodology.

Methods

To calculate wages by business size, BEA's national estimates of nominal wages by industry are distributed using the SUSB distribution of wages by industry and enterprise size. For example, if the SUSB data shows 20% of wages in the construction industry is attributable to businesses with less than 20 employees, then 20% of total wages from the BEA data is allocated

to very small businesses in the construction industry. The same allocation process is performed for gross output using SUSB and NES receipts data by enterprise size. One exception relates to the treatment of owner-occupied housing in the real estate industry, which BEA imputes based on rents charged for similar housing. Since this value is unrelated to business enterprise production, it is removed from the US gross output total for the real estate industry.

In some instances, SUSB industry data by enterprise size were suppressed to prevent the identification of individual business. This was most likely to happen with small businesses. However, an employment range for the business is provided. Additionally, the overall industry totals in the SUSB include the values of the suppressed wages or receipts. Therefore, the difference between the industry total and the sum of the unsuppressed data is the total suppressed value. The suppressed value was allocated to the suppressed cells using the midpoint of the employment range to determine the relative proportion.

RESULTS

Private non-farm nominal wages and gross output between 2002 and 2012 grew slower for small businesses compared to medium and large businesses. With respect to wages, the professional, scientific, and technical services industry was dominant in 2012 for both very small and small businesses. The manufacturing industry garnered the biggest share of wages for medium businesses and the health care and social assistance industry led large businesses. With respect to gross output, the real estate sector was biggest for very small businesses in 2012 and manufacturing was the biggest industry for all other business sizes.

Wages

Wages for very small businesses represented 15% (\$830B) of US wages in 2012 (Chart 1A). Professional, scientific, and technical services represented the largest industry in 2012

(17%), followed by health care and social assistance (14%) and construction (11%). The average annual growth rate for very small businesses between 2002 and 2012 was 2.3%, the slowest of all business classes during that period (Table 2).

Wages for small businesses in 2012 was \$861 billion, slightly larger than wages for very small businesses (Chart 1B). As with very small businesses, the largest industry in 2012 for small businesses was professional, scientific, and technical services (14%). Manufacturing was the second-largest industry for small businesses in 2012, representing 13% of wages. Wages grew faster from 2002-2012 for small businesses than for very small businesses (2.6% versus 2.3%), but still over a percentage point slower than the US total (3.9%).

Wages for medium businesses represented 14% (\$784B) of US wages in 2012 (Chart 1C). Manufacturing represented the largest industry (16%), followed by health care and social assistance (14%) and professional, scientific, and technical services (12%). The average annual growth rate for medium businesses between 2002 and 2012 was 3.7%, over a percentage point higher than the growth for very small businesses. Wages for large businesses in 2012 represented 56% of total wages (\$3.2T; Chart 1D). Health care and social assistance was the largest industry in 2012 (14%), followed by manufacturing (14%) and finance and insurance (12%). Wages for large businesses grew the fastest of all business sizes between 2002 and 2012 at 4.8%.

Gross Output

Gross output for very small businesses represented 18% (\$4.2T) of private, non-farm US gross output in 2012, down from 20% in 2002 (Chart 2). Gross output for small and medium businesses both represented 11% of 2012 gross output (\$2.6T). Large businesses represented 60% (\$14.2T) of total 2012 gross output. The industry with the greatest share of gross output attributable to very small businesses was real estate. Over half (54%) of total gross output in the

real estate industry comes from very small businesses (Table 3). The construction industry had the greatest share of gross output coming from small businesses, representing 25% of the industry total, still less than the share of construction gross output coming from very small businesses (38%).

Between 2002 and 2012, the average annual growth rate for gross output for very small businesses was 3.2%, slower than total US growth of 4.8% during that period (Table 4). Gross output for small businesses grew faster than very small businesses from 2002-2012 (3.7% versus 3.2%), but still more than a percentage point slower than medium and large businesses (5.3% and 5.6%, respectively).

CONCLUSION

This paper presents experimental estimates of wages and gross output by business size and industry sector for 2002-2012. We find large businesses, those employing 500 or more employees, produced just over half of total private wages and gross output between 2002 and 2012. These results are similar to Kobe and Schwinn (2017), which found that large businesses represented 56% of US GDP in 2014. Small businesses, those employing less than 100 workers, experienced relatively slower growth between 2002 and 2012 for both wages and gross output compared to large businesses. Very small businesses, those with less than 20 employees, experienced the slowest growth across all business sizes for both wages and gross output. Additionally, the industry composition for small businesses was different than the industry composition for medium and large businesses. The industry with the greatest share of wages in 2012 for very small and small businesses was professional, scientific, and technical services, whereas manufacturing had the greatest share for medium businesses and health care and social assistance had the greatest share for large businesses. These experimental estimates of wages and

gross output by businesses size and industry provide vital information to policymakers and researchers to better understand the role of small, medium, and large businesses in the US economy.

Statistics by business size offer valuable insights not readily apparent in most national statistics. Economic data by business size and industry exist from a variety of different outlets aside from the SUSB that can be used to develop additional economic statistics presented in this report. Table 5 lists some of these data sources, such as the Statistics of Income data from the Internal Revenue Service which can be used to estimate proprietor's income, or the Medical Expenditure Panel Survey from the Department of Health and Human Services which can be used to estimate employer contributions to employee health care premiums. Future research may look to these additional data sources to expand and improve on these experimental estimates of wages and gross output by business size and industry.

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CHARTS

CHART 1A. INDUSTRY COMPOSITION OF PRIVATE NON-FARM NOMINAL WAGES FOR VERY SMALL BUSINESSES, 2012

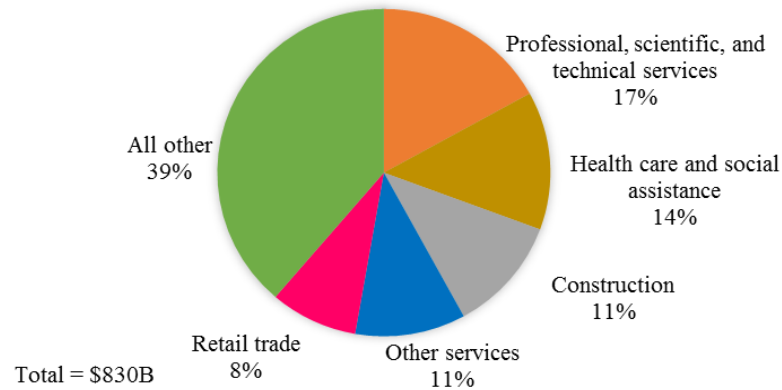


CHART 1B. INDUSTRY COMPOSITION OF PRIVATE NON-FARM NOMINAL WAGES FOR SMALL BUSINESSES, 2012

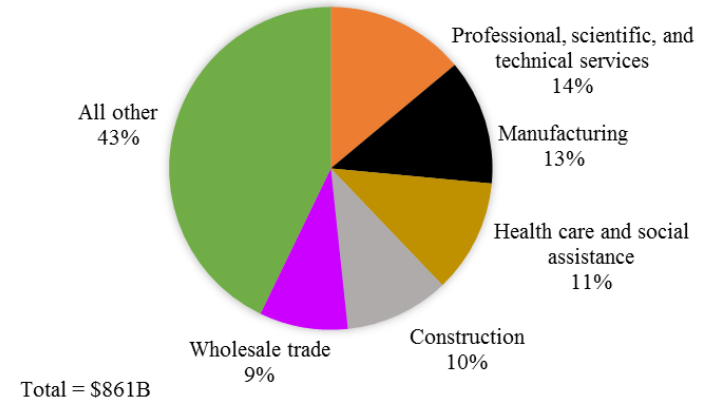


CHART 1C. INDUSTRY COMPOSITION OF PRIVATE NON-FARM NOMINAL WAGES FOR MEDIUM BUSINESSES, 2012

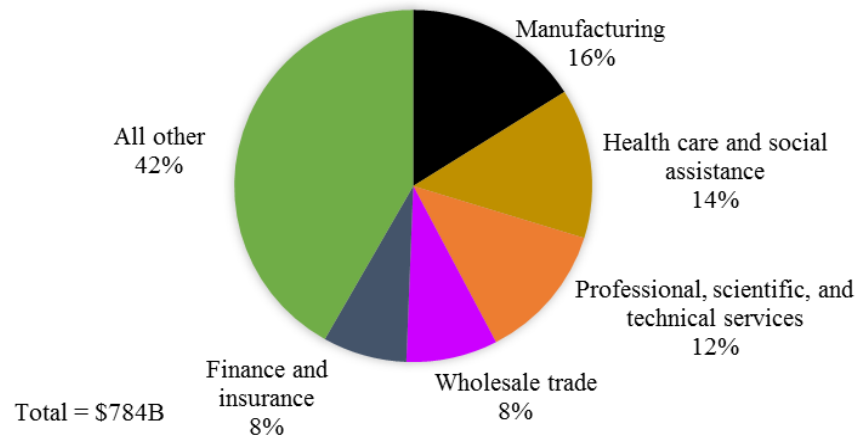
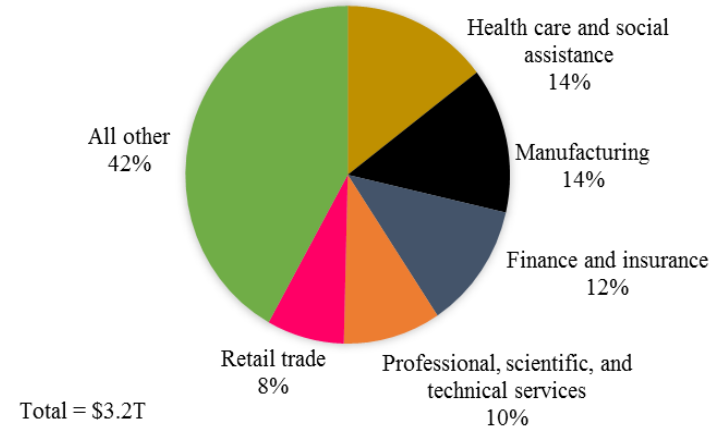
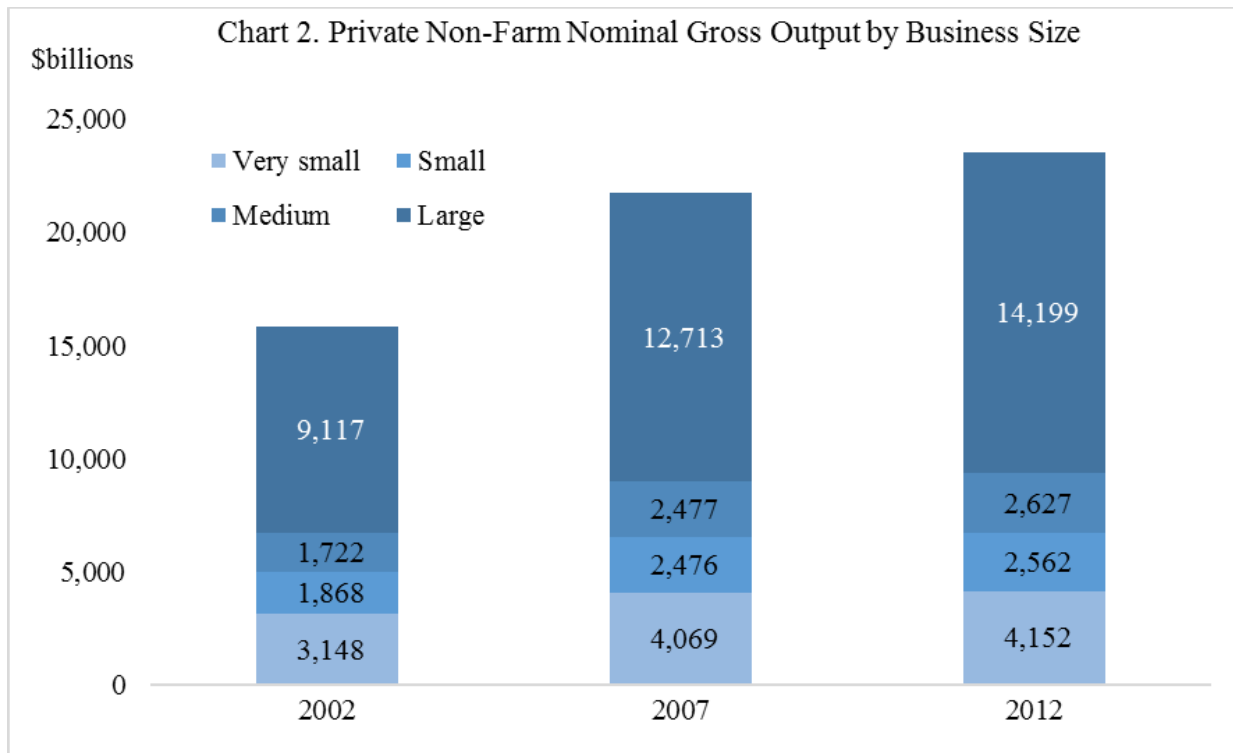


CHART 1D. INDUSTRY COMPOSITION OF PRIVATE NON-FARM NOMINAL WAGES FOR LARGE BUSINESSES, 2012





TABLES

Table 1. Business Size Categories				
	Very small	Small	Medium	Large
Number of employees in the business enterprise	0-19	20-99	100-499	500+

Table 2. Average Annual Growth of Private Non-Farm Nominal Wages by Business Size, 2002-2012	
Very small	2.3
Small	2.6
Medium	3.7
Large	4.8
All businesses	3.9

Table 3. Industry Shares of Private Non-Farm Nominal Gross Output by Business Size, 2012 (%)				
Industry	Very small	Small	Medium	Large
Mining	7	7	10	76
Utilities	2	7	10	81
Construction	38	25	16	21
Manufacturing	4	8	12	76
Wholesale trade	13	13	14	60
Retail trade	21	13	10	56
Transportation & warehousing	34	9	9	49
Information	5	5	7	84
Finance & insurance	5	5	7	83
Real Estate (excludes owner-occupied housing)	53	10	9	28
Professional & technical services	31	16	13	41
Management of companies	3	5	10	81
Administrative services	22	13	12	53
Educational services	9	12	15	64
Health care & social assistance	17	11	12	60
Arts, entertainment, & recreation	34	15	18	33
Accommodations & food services	22	22	12	44
Other services	50	23	13	15
Total	18	11	11	60

Table 4. Average Annual Growth of Private Non-Farm Nominal Gross Output by Business Size, 2002-2012	
Very small	3.2
Small	3.7
Medium	5.3
Large	5.6
All businesses	4.8

Table 5. Potential Data Sources for Comprehensive Economic Statistics by Business Size	
Bureau of Labor Statistics	Business Employment Dynamics Employer Costs for Employee Compensation Quarterly Census of Employment and Wages
Census Bureau	County Business Patterns Economic Census Nonemployer Statistics Survey of Business Owners Survey of US Businesses
Internal Revenue Service	Business Tax Statistics Statistics of Income
Other data sources	Compustat Medical Expenditure Panel Survey National Establishment Time-Series

APPENDIX

Appendix Table 1. Private Non-Farm Wages by Business Size and Industry (billions of nominal dollars)												
Industry	2002				2007				2012			
	Very small	Small	Medium	Large	Very small	Small	Medium	Large	Very small	Small	Medium	Large
Mining	3	4	4	19	5	7	7	35	6	9	11	50
Utilities	1	2	2	35	1	2	3	40	1	3	4	46
Construction	89	87	49	49	113	115	72	69	95	90	55	66
Manufacturing	45	96	107	432	51	110	124	467	50	108	126	450
Wholesale trade	55	62	44	121	66	77	61	167	63	76	65	190
Retail trade	67	68	42	183	73	71	45	231	71	64	43	249
Transportation & warehousing	19	21	18	107	21	24	22	138	23	26	24	147
Information	12	15	17	149	12	16	19	167	12	17	22	174
Finance & insurance	33	33	36	269	43	46	55	383	41	47	60	390
Real estate	24	13	11	24	30	18	15	35	29	19	16	35
Professional & technical services	103	82	63	154	128	105	84	247	141	120	99	313
Management of companies	1	2	9	109	1	3	12	166	1	4	16	200
Administrative services	25	25	29	117	31	33	36	166	30	32	36	190

Appendix Table 1. Private Non-Farm Wages by Business Size and Industry (billions of nominal dollars), continued												
Industry	2002				2007				2012			
	Very small	Small	Medium	Large	Very small	Small	Medium	Large	Very small	Small	Medium	Large
Educational services	5	12	14	44	7	15	18	61	8	18	22	80
Health care & social assistance	85	65	69	251	105	84	91	359	113	98	108	472
Arts, entertainment, & recreation	12	10	14	16	15	12	18	22	17	13	19	25
Accommodations & food services	28	41	21	71	35	51	27	99	41	62	30	109
Other services	68	42	22	27	82	51	27	37	89	56	31	39

Appendix Table 2. Private Non-Farm Gross Output by Business Size and Industry (billions of nominal dollars)												
Industry	2002				2007				2012			
	Very small	Small	Medium	Large	Very small	Small	Medium	Large	Very small	Small	Medium	Large
Mining	15	13	16	151	36	37	45	353	38	40	59	434
Utilities	8	20	20	271	14	22	43	359	8	26	35	298
Construction	390	249	147	181	497	343	227	263	406	270	169	225
Manufacturing	200	343	457	2,940	239	443	637	4,036	237	460	691	4,453
Wholesale trade	140	127	104	522	191	190	163	726	183	191	203	867
Retail trade	253	174	116	497	305	193	134	689	311	190	138	810
Transportation & warehousing	192	55	44	296	313	80	68	406	332	86	84	473
Information	58	55	65	863	65	60	85	998	63	68	92	1,144
Finance & insurance	87	69	118	1,204	113	97	195	1,657	100	90	143	1,630
Real estate (excludes owner-occupied housing)	601	105	81	270	801	151	124	442	821	153	147	437
Professional & technical services	397	185	141	405	501	244	199	598	547	274	224	719
Management of companies	9	8	23	222	8	13	43	368	18	26	54	432
Administrative services	107	62	60	238	150	91	84	339	163	97	91	396

Appendix Table 2. Private Non-Farm Gross Output by Business Size and Industry (billions of nominal dollars), continued												
Industry	2002				2007				2012			
	Very small	Small	Medium	Large	Very small	Small	Medium	Large	Very small	Small	Medium	Large
Educational services	17	24	30	95	22	30	38	139	26	35	46	193
Health care & social assistance	249	133	149	611	310	177	199	862	337	206	236	1,157
Arts, entertainment, & recreation	56	27	30	52	79	36	43	82	92	39	49	89
Accommodations & food services	127	121	67	233	157	150	83	320	176	180	94	357
Other services	240	98	55	64	267	121	68	78	294	132	74	86