



The purpose of this technical report is to explain the method used to create Figure 2-09 on page 31 of Where We Stand, 8th Edition.

Earnings consists of compensation of employees and income of business owners, also known as proprietors' income. In 2012, the average earning per job in the United States was \$57,548. In St. Louis, the average was \$56,614, a difference of \$934.¹ In 2016, the average amount of money earned per job in the United States was \$58,372, compared to \$55,812 in St. Louis, a difference of \$2,560. Thus, the gap between St. Louis and the United States grew by \$1,626 in this four-year time period.

Figure 2-09 on page 31 of Where We Stand, 8th Edition, shows the industries responsible for this change of \$1,626. Further, the growing earnings gap is divided into compensation of employees, versus proprietors' income. Figure 2-09 shows that the largest contributors to the growth in the earnings gap were proprietors' income in the information industry and proprietors' income in the financial services industry, each of which accounted for 20.1 percent of the growth in the earnings gap.

Figure 2-09 was created using data from the Bureau of Economic Analysis, Local Area Personal Income and Employment, Tables CA5 and CA6. While most analysis in Where We Stand used the Metropolitan Statistical Area (MSA) as the level of geography, Figure 2-09 compares the St. Louis Consolidated Statistical Area (CSA) to the United States as a whole. The CSA includes the 15 counties of the St. Louis MSA, plus the Missouri counties of Lincoln and St. Francois. The reason for the change of geography is data suppression: in certain industries, BEA omits data at the MSA level, but includes it at the CSA level. In order to have data on more industries in the analysis, the CSA was used.

The following equations were used to perform the decomposition:

For any given geographic area (U) at a given time (t), earnings (E) is the sum of proprietors' income (P) in each industry (i) plus compensation of employees (W) in each industry:

$$E_t^U = \sum_{i=1}^n P_{t,i}^U + W_{t,i}^U \tag{1}$$

We can divide all terms by total employment in the area to arrive at components of earnings per worker. Lower case letters e, p, and w are used to show values per worker:

$$e_t^U = \frac{E_t^U}{POP_t^U} = \sum_{i=1}^n \frac{P_{t,i}^U}{POP_t^U} + \frac{W_{t,i}^U}{POP_t^U} = p_{t,i}^U + w_{t,i}^U \tag{2}$$

The difference between earnings per worker in the United States (U), and a given CSA (C) at a given point in time may then be decomposed as follows:

¹ All values are adjusted for inflation to 2016 dollars by multiplying the 2012 value by 1.0473.

$$e_t^U - e_t^C = \sum_{i=1}^N (p_{t,i}^U - p_{t,i}^C) + (w_{t,i}^U - w_{t,i}^C) \quad (3)$$

Equation 4 is used to decompose the change in the difference in earnings per worker from one time period to the next:

$$(e_{t+1}^U - e_{t+1}^C) - (e_t^U - e_t^C) = \sum_{i=1}^n [(p_{t+1,i}^U - p_{t+1,i}^C) - (p_{t,i}^U - p_{t,i}^C)] + [(w_{t+1,i}^U - w_{t+1,i}^C) - (w_{t,i}^U - w_{t,i}^C)] \quad (4)$$

In equation 4, each bracketed term on the right side of the equation represents one component of earnings per worker.

The accompanying Excel spreadsheet file, (wws08_technical_report_02_appendix.xlsx) shows how the decomposition was implemented in Excel.

Column C shows 2012 inflation adjusted earnings per worker for St. Louis.

Column D shows 2016 earnings per worker for St. Louis.

Column H shows 2012 inflation adjusted earnings per worker for the United States.

Column I shows 2016 earnings per worker for the United States.

Column K subtracts column C from column H.

Column L subtracts column D from column I.

Column M subtracts column K from Column L.

Column N shows the percent of the change in difference attributable to each industry, stratified by type of income.

Proprietors' income in the construction industry will be used as an example. In St. Louis in 2012, total proprietors' income in construction divided by total employment resulted in a value equal to \$683. In 2016, the equivalent number fell to just \$486 per worker.

In the United States, proprietors' income in construction divided by total employment amounted to \$907 in 2012, and \$1,000 in 2016.

In 2012, then, the difference in proprietors' income in construction between the United States and St. Louis was equal to \$224 per job. The difference rose to \$515 in 2016. The difference between the differences in the two years was \$291. Dividing \$291 by \$1,626 yields 0.179. Thus, proprietors' income in construction accounts for 17.9 percent of the growth in the earnings gap between the United States and St. Louis over the period 2012-2016.