**Appendix: Differences in methods and data sources between Grosse et al. (2009) and present study**

Grosse et al. (2009) estimated 2007-dollar annual productivity values for both market and household production. They separately estimated average daily hours of market and household work (including weekends and holidays) by gender and age in the U.S. non-institutional population using American Time Use Survey (ATUS) data from 2003 to 2007.

To calculate market productivity, Grosse et al. (2009) first estimated average hourly money earnings for wage and salary workers reported in the Current Population Survey (CPS) as usual weekly earnings divided by usual weekly hours worked. Second, hourly wages were increased by a 30.9% fringe benefit rate to calculate hourly compensation. Grosse et al. (2009) stated that the fringe benefit rate was calculated as the total employer cost of insurance, retirement, and legally required benefits to the sum of cash wages, salaries, and supplemental pay earned per hour of work for all civilian workers from the Bureau of Labor Statistics (BLS) Employer Cost of Employee Compensation survey of June 2007. However, the calculation appears to have mistakenly included supplemental pay under benefits; when calculated as specified in Grosse et al. (2009) (removing supplemental pay), the average fringe benefit rate in the 2007 BLS data was found to be 28.4% rather than the reported 30.9%. Annual earnings were calculated as the product of hourly compensation by the average daily number of hours of paid work in a week multiplied by 365.

The other component of market productivity is the earnings for persons with self-employment income. Grosse et al. (2009) chose not to use total earnings reported in the CPS for self-employed persons because self-employment income reflects returns to both labor and business assets. They argued that mean annual earnings (self-employment income plus wages and salaries) reported in the CPS was one-third higher for self-employed persons in 2005 than for workers with only wage and salary income. Consequently, they equated self-employed persons’ mean hourly compensation with that of employees.

Grosse et al. (2009) estimated hours of household services as the sum of time spent caring for household members and time spent in activities, such as inside housework, food cooking and clean-up, household management, shopping, obtaining services, and travel for household activity. The value of household productive time was assessed using the replacement cost method; specifically, the May 2007 mean hourly wage of workers for occupations, such as cooks, janitors, maids, landscaping workers, taxi drivers, child care workers, home care aides, etc., in the Occupational Employment Statistics survey. The average wage of $10.48 was multiplied by 1.189 for a total of $12.46 per hour in order to adjust for benefits paid to part-time service occupation workers, including payroll taxes, in the June 2007 Employer Cost for Employee Compensation survey.

The present study differs from that of Grosse et al. (2009) in both data sources and methods. In terms of market productivity, instead of estimating hourly earnings and daily hours of work, then multiplying by 365 to calculate annual earnings, the present study used ACS data to directly estimate annual earnings. Second, the present study used the Bureau of Economic Analysis (BEA) index of employee supplements, which varied by year from 23.4-24.8% of money earnings, to adjust money earnings for total compensation. More than one-third of the difference relative to the rate used in the Grosse et al. (2009) estimates was accounted for by the calculation mistake by Grosse et al. (2009) noted above. The remaining difference is presumably accounted for by the difference in the BLS estimates reported per hour worked and the BEA estimates reported per year.

Instead of assuming that self-employed persons have the same hourly labor productivity as persons relying solely on wages and salaries, as in Grosse et al. (2009), the present study calculated total annual earnings from wages and salaries (adjusted for benefits) and self-employment. Unlike the CPS, the ACS reports self-employment income separately from wage and salary income for individuals who have both types of income. Many individuals who own small businesses draw both a salary and profit from the business, with just the business profit reported as self-employment income. Roughly one-third of individuals who report self-employment income in the CPS reported both salary and self-employment income. It could be argued that the reported self-employment income is a hybrid of returns to capital and labor and might thereby overstate earnings from labor. On the other hand, those who reported both types of income had above average annual wage and salary income, whereas those who reported self-employment income alone had substantially lower earnings than those who reported only wage and salary earnings. In addition, among those who reported both types of earnings, self-employment income comprised roughly one-fourth of total reported earnings.

Grosse et al. (2009) estimated household productivity as household chore activities and direct care provided for household members, including time spent in child care as the primary activity. The present study estimates the value of a broader metric of non-market productivity, which includes both volunteer activities benefiting people outside the household and time spent in primary activities other than household services in which someone monitored children under the age of 12 years as a secondary activity. In addition, secondary eldercare activity is separately recorded in the ATUS beginning in 2011. Consequently, average daily hours of non-market productivity increased from 3.10 in Grosse et al. (2009) to 4.57 in the present study. The majority of that difference is attributable to the inclusion of time spent in secondary child care, such as watching children while primarily engaged in leisure activities, such as watching television. It is logically correct to include the replacement cost of time spent in secondary child care, as is done in the present study, because if the caregiver were sick or disabled, either a paid caregiver would be needed or another adult would have to take his or her place.

Deficiencies of solely using the ATUS for market productivity estimation in Grosse et al. (2009) include limited wage-earnings data. In addition, because of its small sample size, daily respondent-level market work hours from the ATUS might not reliably extend to annual values for the entire US population. To minimize the small sample size issues with the ATUS, Grosse et al. (2009) followed the convention of combining several years of ATUS data together to produce estimates.[[1]](#footnote-1) For example, while the Grosse et al. (2009) estimates were built on 2007-dollar wage levels, the estimated hours of productive work were five-year 2003-2007 averages.

Annual market productivity in 2007 dollars per individual aged 15 and over using ACS data from 2007 is estimated to have been $32,902, which is 2% higher than the equivalent estimate of $32,225 reported by Grosse et al. (2009) for the same year. Non-market productivity per person using ACS data from 2007 is estimated to have been $19,124, which is 40% higher than the estimate of annual household production of $13,613 in 2007 dollars by Grosse et al. (2009). Overall labor productivity for 2007 was $45,838 according to Grosse et al. (2009) and $52,026 in the present study, a difference of 13%.

1. From the Bureau of Labor Statistics: “The ATUS multi-year microdata files combine several years of previously-released and publicly-available ATUS microdata. Because changes in time use occur relatively slowly over time, it is possible to combine multiple years of ATUS data; doing so facilitates more detailed analyses about how Americans spend their time.” (See <https://www.bls.gov/tus/datafiles_my.htm>) [↑](#footnote-ref-1)