Making a Middle Class: Colleges and Cities in the Mountain West

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Making a Middle Class:
Colleges and Cities in the Mountain West

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Abstract
A stronger middle class is important for the economic and political future of both cities and nations. Analyses focusing on the size of the middle class can be misleading, providing information on income inequality or temporary economic conditions. More important than the size of the middle class is the quality of life of the middle class. Higher education can serve students from middle-class backgrounds, helping them sustain a middle-class standard of living and rise up the economic ladder, as well as providing “on ramps” to the middle class for those from low-income backgrounds. We show that middle class wage earners bore the brunt of the Great Recession in Las Vegas. Using a new metric of mobility based on data from Opportunity Insights, we also examine the contribution of colleges in the Mountain West to serving and strengthening the middle class.

Introduction
The quality of life of the middle class is a vitally important economic, social, and political issue. In recent decades, middle-class families have seen slower income growth than those above and below them. Wages have grown painfully slowly for less-educated women¹, and have fallen for less-educated men.

The desire to secure and sustain a middle-class standard of living is virtually universal. But the opportunity to do so is not. Place matters. In some cities, the middle class is thriving, and low-income children are rising up to join its ranks. In others, the middle class is sliding (even shrinking, on some measures), and upward mobility rates are low.
Education is key, providing, at its best, a strong boost to the chances for individuals to move up the economic ladder, as well as the skills required for flourishing local labor markets. While our focus here is on the Mountain West, the implications of our analysis of middle-class size at the metro level, and the “middle-class-making” capacity of local colleges, have broader applicability.

Is the Las Vegas Middle Class Shrinking?

In recent years, there has been growing concern about the size of the middle class. This is not just a U.S. anxiety; a recent report from the OECD\(^2\) reported that the middle class is shrinking in most member nations.

But the middle class can only change size if it is defined in a certain way. It can also change size for radically different reasons—because more (or fewer) people are rich, or because more (or fewer) people are poor. Prognostications on the size of the middle class can therefore be misleading and should be treated with caution.

One definition popularized (in the U.S.) by the Pew Research Center has generated headlines\(^3\) about the “shrinking middle class” in Nevada and Las Vegas, for example. Pew classifies households as middle class if they earn between two-thirds and twice median income. For a household of three in 2017, these thresholds nationally were about $46,000 and $139,000.\(^4\) The share of U.S. households who fall within this range changes along with the shape of the income distribution. Pew estimates\(^5\) that the share of U.S. adults living in middle-income households has fallen sharply, from 61% in 1971 to 52% in 2016.\(^6\)

The Future of the Middle Class Initiative at Brookings defines the middle class\(^7\) as households in the middle 60% of the national income distribution. Under our definition, the middle class cannot change in size at the national level, since 60% of U.S. households are in the middle class, by definition. But it may grow or shrink in a given metropolitan statistical area, or MSA (or any other subnational geographic region). Our range is a little lower than Pew’s, including households with incomes between about $31,000 and $133,000 for a household of three in 2017.\(^8\)

Has the middle class in Las Vegas shrunk? Yes—on Pew’s definition. No—on ours.

Using Pew’s definition, the share of households in the Las Vegas-Henderson-Paradise MSA (hereafter referred to as Las Vegas) who are middle class dropped from 57% to 52% between 1999 and 2017.\(^9\) But according to the Brookings definition, the share of households in the middle class remained essentially the same over the same period: 64% in 1999, 65% in 2017.\(^10\)
This is a difference worth investigating, not least because of the popular media attention such questions generate. Figure 1 shows the distribution of household incomes in the Las Vegas MSA in 1999, 2011, and 2017.\textsuperscript{11}

**Figure 1**

*Shifts in the Las Vegas Income Distribution*

The income distribution of Las Vegas shifted to the left between 1999 and 2011, as median income in Las Vegas declined sharply, from about $73,000 to $60,000 for a household of three.\textsuperscript{12} Median income was actually slightly greater in Las Vegas than in the U.S. as a whole in 1999 but fell below the national median during the Great Recession. Incomes have subsequently shifted back in a more positive direction but have not yet returned to pre-recession levels.

Since income fell more in Las Vegas than nationally, a greater share of households qualified as “low-income”—i.e. below the threshold for the middle class—in 2011 than in 1999, under both the Brookings definition (under the 20\textsuperscript{th} percentile of the national distribution) and Pew definition (under 67\% of the national median).

The distribution has since shifted slightly back toward its 1999 position, as median income in Las Vegas rose to $65,000 in 2017. Between 2011 and 2017, the size of the middle class increased by a little under two percentage points under both definitions (though there has been substantial noise between those years).\textsuperscript{13} Table 1 shows the share of households in Las Vegas who were low-, middle-, or high-income under the Pew and Brookings definitions in 1999, 2011, and 2017.
Both definitions show a rise in the share of households that are low-income and a decline in the share that are high-income. But the effect on the size of the middle class depends on the precise thresholds by which the middle class is defined. Figure 2 shows that the Brookings definition (in blue) captures a lower portion of the income distribution than the Pew definition (in yellow). As the income distribution in Las Vegas has shifted to the left since 1999, some households have “dropped out” of the Pew middle class but remained in the Brookings middle class.

The takeaway here is that the size of the middle class, however defined, is highly sensitive to the selection of arbitrary thresholds. What matters in our view is not quantity (i.e. the size of the middle class) but quality—specifically, quality of life. Modest changes in the size of the middle class are second-order concerns next to the economic and social conditions of the middle class. We turn to this question next.
Migration and the Middle Class

The middle class within a city might also grow or shrink because of migration, rather than because of changes in the economic circumstances of the families already there. For instance, the share of households who are low-income may increase (and the share who are middle class decrease) as a result of an inflow of low-wage workers into the MSA. This is a particularly important consideration for Las Vegas, because it had the greatest population growth of any of the 100 largest MSAs in the two decades prior to the Recession—by 86% in the 1990s and 42% in the 2000s, according to our colleague William Frey.14 This means that many of the households living in Las Vegas in 2011 were not living in Las Vegas in 1999, the first year of our analysis.

What impact did this have on incomes in the city? In fact, despite the rapid population growth of the early to mid-2000s, the distribution of income in Las Vegas changed very little over this period. It was not until the onset of the Great Recession that the share of households in the bottom quintile of the national income distribution began to increase, and the share in the top quintile to decrease. Frey shows that population growth slowed after 2006, largely driven by declining Hispanic migration to Las Vegas as construction jobs disappeared. Population growth totaled just 14% between 2010 and 201815—still substantial compared to many other MSAs, but much reduced since the boom years of the 1990s. Once a very popular destination for those hoping to reach the middle class, Las Vegas has struggled to maintain and rebuild middle-wage jobs in the wake of the downturn.

The Las Vegas Middle Class: Hit Hard, Still Bruised

Las Vegas was among the ten metros hit hardest by the Great Recession.16 And the middle got hit hardest of all. Figure 3 shows that wage growth in the middle of the distribution in Las Vegas and other hard-hit MSAs (and especially in the second and third wage quintiles) was much lower than in less-affected areas.

As such, Las Vegas faces the challenge of rebuilding wages and incomes for middle-class families. One of the most important routes to a middle-class income—and likely to be become even more important—is post-secondary education. We turn to this next.
Colleges and Upward Mobility

 Debates on post-secondary education tend to be dominated by the tails—that is, either on the importance of colleges for those from poor backgrounds, or on the cost of and access to elite institutions, which overwhelming serve students from upper middle class (fewer than 2% of young people from the middle 60% of the income distribution actually attend elite colleges). The role of colleges in serving students from middle-class backgrounds—or helping more to rise into the middle class—is a neglected area of study.

 In their groundbreaking work on the role of colleges in intergenerational mobility, Chetty et al. (2017) primarily focus, for example, on bottom-to-top mobility. Their headline measure of mobility combines access—the share of students who come from the bottom quintile—and success, defined as the share of those students who reach the top quintile. This bottom-to-top mobility is very rare, however: the average mobility rate for all the colleges in the Chetty et al. (2017) dataset is just 1.7% (i.e. 1.7% of U.S. students move from the bottom quintile to the top quintile).

 Figure 4 shows the access and success rates at all colleges in the U.S., highlighting major colleges in Las Vegas and elsewhere in the Mountain West. The University of Nevada, Las Vegas (UNLV) moves 1.9% of its student body from the bottom to top quintile, ranking slightly above average. Note that while UNLV’s success rate is nearly identical to that of the University of Nevada, Reno (UNR), its overall mobility rate is higher because a greater share of its students come from the bottom quintile:
There is nothing wrong with this mobility measure. It simply emphasizes a Horatio Alger, rags-to-riches kind of mobility, from the bottom rung to the top rung. But it does mean that very small changes in the measure can move colleges a long way up or down the mobility league table. More importantly, it provides no information on how far colleges are serving and helping students from middle-class families, or getting poor kids into the middle class. This can however be done using the data, since the Chetty team make it available to the public.

Hoxby and Turner (2019)\(^{18}\) additionally criticize this bottom to top quintile measure for potentially conflating a school’s effort with its circumstances. They write that “measures mean[t] to measure a university’s effort to enroll well-qualified low-income students...can largely reflect differences in the pools of students from whom the universities could plausibly draw.” This is particularly salient for non-elite schools that tend to draw from more local areas rather than from the national student pool. For instance, Hoxby and Turner show that schools located in areas with fairly equal income distributions, such as Wisconsin, may draw from a pool of primarily middle-class students and relatively few low- or high-income students. By contrast, schools in highly unequal areas (e.g. California) may have a large pool of low-income students to draw from, and may thus find it easier to enroll a greater portion of students from the bottom quintile. Hoxby and Turner therefore recommend measuring access for low-income students \textit{relative} to the number of low-income students in the school’s “relevant pool.”\(^{19}\)
The challenge is to define a school’s relevant pool. Taking Nevada as an example, it is highly likely that UNLV draws primarily from the Las Vegas metropolitan area, its home city and the most populous region of the state. In 2018, 26,000 out of 30,000 UNLV students were from Nevada. In this case, if we were to take up the Hoxby and Turner challenge, we might want to compare the income distribution of students to the income distribution of Las Vegas, illustrated in the previous section. Figure 5 shows the income backgrounds of students at UNLV, as well as UNR, and the College of Southern Nevada.

Figure 5

<table>
<thead>
<tr>
<th>College</th>
<th>Bottom</th>
<th>Second</th>
<th>Middle</th>
<th>Fourth</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Nevada, Las Vegas</td>
<td>37%</td>
<td>45%</td>
<td>20%</td>
<td>25%</td>
<td>7%</td>
</tr>
<tr>
<td>University of Nevada, Reno</td>
<td>19%</td>
<td>26%</td>
<td>23%</td>
<td>20%</td>
<td>13%</td>
</tr>
<tr>
<td>College of Southern Nevada</td>
<td>16%</td>
<td>9%</td>
<td>4%</td>
<td>12%</td>
<td>7%</td>
</tr>
</tbody>
</table>

Source: Data from Raj Chetty, John Friedman, Emmanuel Saez, Nicholas Turner, Donny Yagan. "Mobility Report Cards: The Role of Colleges in Intergenerational Mobility." NBER Working Paper No. 23618, 2017, Online Table 2.

A key question here is whether UNLV and UNR draw from the same geographic area (that is, the state of Nevada). If so, then the chart above suggests that UNLV is somewhat more accessible to low- and middle-income students than UNR. But if the schools primarily draw from more limited local regions, then they may face different student “pools.”

One simple approach is to look at the income distributions of the area surrounding the institution. Chetty supplies information on the income distribution for parents of college-aged students by commuting zone (similar to MSAs but typically larger, covering the entire land area of the United States, whereas MSAs exclude rural areas). About 64% of students in the Las Vegas commuting zone come from the middle class, and 17% come from the top quintile. In the Reno commuting zone, 79% come from the middle class, and only 8% from the top quintile. This suggests that UNR may be even less accessible to middle class students, at least locally. But without more data, we do not know with any certainty how to define the relevant “pool” from which the college is drawing.
Chetty et al. point out that there is almost as much variation in mobility rates for colleges within the same commuting zone as between all colleges across the country. This implies that the “relevant pool” question raised by Hoxby and Turner is not very consequential. We do not adjudicate this argument here, though it is an interesting and potentially important one. Instead, we restrict our attention to large public colleges in the Mountain West, thereby largely avoiding the issue by comparing schools that draw from at least broadly similar pools. We also focus on the middle class (i.e. middle 60% by household income), which is a much larger group and so less sensitive to any differences in the local income distribution. Most colleges can reach a reasonably large pool of middle-class students.

Towards a Middle-Class College Mobility Measure

Next, we construct a new mobility measures of how far colleges promote mobility into or above the middle class. We distinguish between mobility for students from the middle class into a higher quintile, and for students from the bottom quintile into the middle class.

First, we need a measure of middle-class access. On the face of it, this is a simple task: just measure the fraction of students at a college who come from the middle class. But this could end up penalizing schools that take more students from the bottom quintile. Imagine two schools that take the same fraction of their students from the bottom quintile, but different fractions from the bottom and top quintiles. Say each school moves 30% of its middle-class students into the top quintile. Because the schools have the same middle-class access and success rates, they have equivalent middle-class mobility rates: 12% of their students come from the middle class and reach the top quintile.21

<table>
<thead>
<tr>
<th>Parental Income Distribution</th>
<th>Bottom Quintile</th>
<th>Middle Class</th>
<th>Top Quintile</th>
<th>Middle-Class Success Rate</th>
<th>Middle-Class Mobility Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>School 1</td>
<td>10%</td>
<td>40%</td>
<td>50%</td>
<td>30%</td>
<td>12%</td>
</tr>
<tr>
<td>School 2</td>
<td>50%</td>
<td>40%</td>
<td>10%</td>
<td>30%</td>
<td>12%</td>
</tr>
</tbody>
</table>

This measure would reward a school for reducing the fraction of students who come from either the top quintile or the bottom quintile in favor of enrolling more students from the middle class. In our view, it would be a mistake to construct a measure of middle-class access that penalizes a college for taking a high proportion of its students from low-income families. To avoid this, we calculate access rates for the middle class compared to
access rates for the top quintile—in other words, by taking out the bottom quintile altogether. The new middle-class access rate is thus the number of students who come from the middle class (middle three quintiles) as a share of students from the top four quintiles (for more details see the Methodology section).

Among the students at School 1 and School 2 who do not come from the bottom quintile, 44% and 80% come from the middle class, respectively. School 2 thus has a higher middle-class mobility rate: 24% of students from the top four quintiles move from the middle class to the top quintile.

Table 3
Middle Class College Mobility: New Access Measure

<table>
<thead>
<tr>
<th>Parental Income Distribution</th>
<th>Middle Class</th>
<th>Top Quintile</th>
<th>Middle-Class Success Rate</th>
<th>Middle-Class Mobility Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>School 1</td>
<td>44%</td>
<td>56%</td>
<td>30%</td>
<td>13%</td>
</tr>
<tr>
<td>School 2</td>
<td>80%</td>
<td>20%</td>
<td>30%</td>
<td>24%</td>
</tr>
</tbody>
</table>

Getting students into the top quintile is, of course, not the only way colleges can promote mobility or support students. How about a student from a family in the second-poorest quintile who moves up to the middle quintile? Even moving up one quintile is progress. But if moving up one quintile is good, moving up two, three, or four is even better.

For some students, just maintaining the same position on the income ladder as their parents, rather than sliding down, might count as success. Staying in the same quintile may not seem great—but it is better than being downwardly mobile. Ideally, an assessment of a college’s performance would take all these differences into account, giving more credit for bigger moves up the ladder.

We adopt a simple approach by calculating college mobility scores based on the average number of quintiles moved among students at the college. Big moves up the income ladder will pull up the average; downward movements will pull it down. We apply this mobility measure to students from the middle 60% (adjusted as described above). Figure 6 presents the mobility score is on the y-axis and middle-class access is on the x-axis.

Colleges with positive mobility scores move students up the income distribution, on average, while colleges with negative mobility scores move students down the income distribution. In many cases, the latter will be true if a college takes relatively more of its middle-class students from the fourth quintile, who have little “room” for upward mobility (since they can only be upwardly mobile if they reach the top quintile), but more room for downward mobility.
Figure 6
Mobility Scores for Students from the Middle 60%

The average number of quintiles moved is low across the whole distribution of colleges: the national figure is 0.2. A number of points are worth making here. Relative mobility is a zero-sum game; in order for people to move up the ladder, an equivalent number have to move down. While those who attend college are less likely to move down than those who do not (see chart), they are not immunized entirely against the risk of downward relative mobility. The very large numbers now enrolling in college means that there will be both upward and downward mobility among college enrollees.

One more point on interpretation, prompted in part by the striking negative average mobility number for Utah State. The adult incomes of the children are measured and ranked on an individual basis, rather than in terms of household income. The Chetty data also includes individuals who report zero earnings. So if, say, married women file taxes jointly with their husbands but are not themselves earning any income, they will have zero individual earnings (and by definition, therefore, are in the bottom income quintile).

Utah State University has the 24th-highest marriage rate of any college in the country. Four out of five former students were married in 2014. We can also see that students from higher-income families are more likely to be married than students from lower-income families; about 64% of Utah State students from the bottom quintile are married, compared to 82% of those from the fourth and fifth quintiles.

When Chetty et al. take those with zero earnings out of the sample, median income for students at Utah State rises from $30,000 to $42,000, or 39%. It seems almost certain,
then, that the low mobility rates for Utah State, and indeed for other Utah colleges, are likely to be generated by the unusually high proportion of zero earners, and that this in turn is likely the result of its unusually high marriage rates, and possibly lower rates of maternal employment; Brigham Young has an even higher marriage rate and an even lower middle-class mobility score. Great care is required in interpretation here.

Colleges with mobility scores around zero are, on average, largely keeping students in place. For the middle class, this is not necessarily a bad outcome. Most community colleges, including the College of Southern Nevada, take the bulk of their students from the middle class and send most of them back into the middle class. The outcomes for those who do not attend college are considerably worse.

How about lifting poor kids into the middle class or higher? We turn next to the mobility for students from the bottom quintile. For our measure of success here we have selected the proportion rising into the top 60% (i.e. moving up at least two quintiles). This could be seen then a measure not just of moving into the middle class, on our broad, middle-60% definition, but into a more “solidly” middle class position.

**Figure 7**

**Mobility into the Middle Class**

![Image](image_url)  


Notes: Arizona includes Arizona State, University of Arizona, and Northern Arizona.

**Labor Markets or Colleges?**

It is important to stress that the economic outcomes of students attending a particular college reflects a range of factors independent of the college itself. The level of academic
readiness of students enrolling at different institutions, even at similar levels of selectivity, may vary considerably. The state of the labor market they graduate into will vary, too. So while we know that people who do not attend college are almost always less upwardly mobile than those who attend almost any college, we do not know if the same students would have high rates of upward mobility if they enrolled in, say, Colorado State. Low- and middle-income students who attend Colorado State likely differ in other ways from those who do not attend college—or, for that matter, from those who attend the College of Southern Nevada.

Colleges may benefit from a location in a strong labor market where many middle- or high-wage jobs are available to recent graduates; they may be harmed by a struggling local labor market. For schools that send most of their students into jobs nearby, the availability of middle- and upper-income job opportunities will clearly impact on outcomes. We have already seen that Las Vegas was hit hard by the recession, and especially in the middle of the wage distribution. The data we draw on in this report measures adult earnings measured in 2014. Persistently low middle-class wage growth in Las Vegas through 2016 has therefore almost certainly likely made it more difficult for students who stay local after leaving college to secure a higher position on the income ladder: important context for the mobility performance of local colleges.

Conclusion

Building a stronger middle class is a priority for the nation. This work must be done not just nationally, but by metros and institutions—not least, colleges. This is especially true in cities like Las Vegas, where middle class workers were hit hardest by the recession. The role of colleges in serving students from middle class backgrounds has been overshadowed in policy debates by a focus on students from poor families, and on mobility to the top rung of the income ladder. In this paper we construct new measures of middle-class college mobility, using institutions in the Mountain West by way of illustration and motivation. Most of these colleges help middle class students move up the economic ladder, or at least protect them against downward mobility. But there are differences by institution in terms of both access rates for middle class students and their average outcomes. The Nevada universities are among the cluster of institutions within the Mountain West with higher mobility rates, with UNLV enrolling more students from the middle class.
Appendix: Methodology

Section 1

Data sources. Data in the first section of this report are drawn from the public-use versions of the 2000 decennial census and the 2005-2017 American Community Survey (ACS), downloaded from the Integrated Public Use Microdata Series (IPUMS) versions provided by the University of Minnesota.

Income. Household income is the sum of self-reported, pre-tax money income received by all household members ages 15 and older. This includes labor earnings, self-employment income (net of business expenses), interest and dividends, income from estates and trusts, net rental income, Social Security, Supplemental Security Income, public assistance, pensions, unemployment compensation, child support, alimony, and any other regular sources of cash income. It does not include capital gains or in-kind (non-cash) transfers.

Household size. Income is adjusted for household size to reflect that, for example, a single individual living off of $50,000 is materially better off than a four-person household with the same income. This adjustment also helps to reflect that declining household sizes have eased the pressure on the average household’s budget. We use a square root equivalence scale to adjust for household size. This means that we divide income by the square root of the number of people in the household, which allows for “economies of scale” in household consumption. We multiply all households’ incomes by the square root of three in order to express income in household-of-three equivalents.

Inflation. Incomes are adjusted for inflation using the Consumer Price Index for All Urban Consumers (CPI-U). Inflation adjustment will not impact the assignment of households to different income groups within a given survey year. It will, however, impact comparisons of median income.

The 2000 census collected data on household income received in the calendar year 1999. We thus assign income reported in the 2000 census to the calendar year 1999. The ACS is conducted every month and asks respondents about to report income received during the previous 12 months. This means that respondents interviewed at the beginning of 2017 reported income earned in calendar year 2016, whereas those interviewed at the end of 2017 reported income earned in calendar year 2017. Because income reported in the ACS spans the survey year as well as the previous year, we adjust for inflation in the ACS using the average CPI-U across these two years.

All income is reported in 2016-17 dollars.
**Metropolitan areas.** Metropolitan statistical areas (MSAs), delineated by the U.S. Office of Management and Budget (OMB), consist of a county or counties that are associated with at least one urbanized area of at least 50,000 people, plus adjacent counties that have “a high degree of social and economic integration with the core as measured through commuting ties” (Census Bureau). To compare MSAs across time, we use the IPUMS variable MET2013, which identifies metro areas using the 2013 OMB delineations. MET2013 is available only for the survey years 2000 and 2005-2017.

**Regional prices.** Regional Price Parities (RPPs) published by the Bureau of Economic Analysis measure price levels in metropolitan areas as a percentage of the overall national price level. RPPs are available only from 2008 to 2016, so we do not adjust for regional differences in price levels in our main analysis, which relies on income data from 1999 to 2017. Since price levels in Las Vegas are very close to national price levels (at 97.8% of national prices in 2016, down slightly from 100.9 in 2008), adjusting for regional price differences would not have a large impact on the share of Las Vegas households who are part of the national middle class.

**Definitions of the middle class.** We should note a few differences between our application of Pew’s definition and Pew’s own reports on the middle class in metropolitan areas from 2016 and 2018. Note that these reports show that the size of the middle class dropped from 59.7 percent in 1999 to 55.5 percent in 2016 (the latest year available at the time), compared to our own estimates of 57 percent in 1999 to 51.4 percent in 2015.

First, Pew’s researchers adjust income for differences in the cost of living across metropolitan areas using Regional Price Parities (RPPs) from the Bureau of Economic Analysis, described above. Since RPPs are only available from 2008 to 2016, and our analysis extends from 1999 to 2017, we do not adjust for differences in the cost of living across metropolitan areas. For comparison, however, if we apply the 2016 RPP for Las Vegas to all years of data, we find that the share of Las Vegas households in the middle class has declined from 56.8 to 52 percent.

Second, Pew describes the size of the middle class in terms of the share of adults living in middle-income households, rather than the share of households in the middle class. Using our RPP-adjusted estimate, the share of adults in Las Vegas who are middle class declined from 59.4 percent in 1999 to 55.5 percent in 2017. The slight difference between our estimate for 1999 and Pew’s can be explained by the fact that we use the 2016 RPP to adjust for the cost of living in 1999, while Pew uses the 2013 RPP.

**Kernel density.** Kernel density estimation is used to estimate a probability density function for a population based on a data sample. This is similar to a histogram in that
observations are “binned” along the x-axis, and the height of the bars (or, in the case of kernel density estimates, the height of the curve) indicates the frequency with which observations appear in that bin relative to other bins. Larger bin widths result in smoother curves. The total area under each curve sums to 1; the area under a portion of the curve between two values on the x-axis (for instance, the shaded area representing the middle class) is the estimated fraction of the population within that range. We estimate the income distribution in Las Vegas using the Epanechnikov kernel with a bin width of $4,300.

Section 2

We use publicly released data from Chetty et al. (2017) on the cohort of college students who were born in 1980-1982 and attended college between the ages of 19 and 22 in the early 2000s. Parental income is measured as average annual household total income before taxes and transfers over the five years when the student turned 15-19. Students’ income as adults is measured as individual labor earnings in 2014, when the relevant cohort was between the ages of 32 and 34. Parents’ percentile ranks are generated by ranking parents based on their incomes relative to other parents with children in the same birth cohort. Students’ percentile ranks are generated by ranking students based on their earnings relative to others in their birth cohort.

Students are assigned to the college they attended most frequently during the calendar years when they turned 19 to 22. If a student attended a community college for the first two years and then transferred to a four-year school for the remaining two, they would be assigned to the first college attended (the community college).

This analysis will not capture older cohorts of students who attended these institutions during the same time period. This will likely have an outsized impact on two-year, less-than-two-year, and for-profit schools, where many students are beyond the age of 22.

We generate our measure of the average number of quintiles moved as follows. We use existing measures of the number of students at the college in the given cohort (measured as the average cohort size for the 1980-82 cohorts) and the share of students from each quintile in order to calculate the number of students in each quintile. We multiply the number of students in each quintile by the share of students within that quintile who end up in each of the other quintiles to obtain the number of students within each quintile who move up or down a given number of quintiles. For example, suppose we know that 100 students at a given college come from the second quintile, and that 20% of them end up in the top quintile. We can then say that 20 students from the second quintile move up by 3 quintiles.

To obtain the overall number of students at the college who move up or down a given number of quintiles, we simply sum across each parental quintile. For example, if 20
students from Q2 and 15 students from Q1 move up by 3 quintiles, then 35 students at the college move up by 3 quintiles. (Students from Q3 and beyond cannot move up by 3 quintiles.) We then take the weighted average across all students, where the weight is equal to the positive or negative number of quintiles moved. For example, the number of students who move down by 2 quintiles is multiplied by -2, the number who remain in place is multiplied by 0, the number who move up by 3 quintiles is multiplied by 3, and so on. If 200 students at a college move up by 2 quintiles, 400 move up by 1 quintile, 300 remain in place, and 100 move down 1 quintile, then the average number of quintiles moved is 0.7:

\[ \frac{2(200) + 1(400) + 0(300) - 1(100)}{200 + 400 + 300 + 100} = 0.7 \]
Endnotes


4 These thresholds are obtained from the 2017 American Community Survey. We have applied Pew’s definition to the most recent ACS data.


6 Pew generally describes the size of the middle class in terms of the share of adults living in middle-income households.

7 Richard Reeves and Katherine Guyot, “There are many definitions of ‘middle class’ – here’s ours,” The Brookings Institution, September 2018 (https://www.brookings.edu/blog/up-front/2018/09/04/there-are-many-definitions-of-middle-class-heres-ours/).

8 This report uses data from the American Community Survey (ACS) in order to identify metro areas; however, we recognize that income data in the ACS are inferior to other sources. In previous work, we have used thresholds established by the Congressional Budget Office to identify the middle class as households earning between $37,000 and $147,000 in 2014. See appendix for details about our methodology.

9 Our application of Pew’s definition differs from Pew’s own reports in two ways: we do not adjust for differences in the cost of living across metropolitan areas, and we report the share of households rather than the share of adults in the middle class. See Methodology section for details.

10 Small changes are not necessarily statistically significant and should be interpreted with caution.

11 See Methodology section for details about kernel density estimates presented below.

12 The American Community Survey is conducted on a monthly basis and asks respondents to report their incomes in the previous 12 months. Thus, estimates for 2011 actually apply to a rolling one-year period between 2010 and 2011, and estimates for 2017 actually apply to 2016 and 2017. Since estimates for 1999 come from the 2000 Census, which asked respondents to report their incomes for the previous calendar year, estimates for 1999 actually refer to 1999. We show the graph for 2011 because this is when the middle class in Las Vegas was smallest under both definitions.

13 The American Community Survey is only a sample of the population, so estimates are subject to error.


17 See appendix for details about the data.


19 Hoxby and Turner additionally limit the relevant pool to students who meet the college’s academic standards, or those whose test scores place them within the 25th to 75th percentile range of the college’s student body. We take issue with this choice on the basis that, given the strong correlation between test scores and income, a college could appear more accessible simply by limiting its relevant pool to a higher-achieving group of students. Declining access for lower-income students is a key tradeoff a college makes when it becomes more selective.


21 This is analogous to the bottom-to-top mobility measure in Chetty et al., but applied to the middle three quintiles instead of the bottom quintile. That is, the mobility rate is the product of access and success.

22 The College of Southern Nevada is actually classified as a four-year public college in the dataset, because colleges are classified based on the highest degree offered. According to IPEDS data, however, the College of Southern Nevada primarily offers associate degrees and undergraduate certificates, and awarded only 25 bachelor’s degrees in 2017-18 (of over 1,345 total degrees or certificates).


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