In and Out of Poverty:

Poverty spells and income volatility in the U.S. Financial Diaries¹

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Abstract

We use data from the U.S. Financial Diaries project to relate entry and exit from poverty to intra-year income volatility and to the availability of government transfers. The U.S. Financial Diaries data set tracks a continuous year’s worth of month to month income for 235 low-income and moderate-income households in the United States. The analysis here builds on evidence showing that poor families experience considerably more income volatility than better-off households. We show that the income volatility translates into frequent spells of poverty for “non-poor” households. We then decompose how the coefficient of variation of income changes in response to receipt of seven types of government transfers. The transfers reduce volatility mainly by raising the mean of income rather than by reducing its variability. A regression model is developed to investigate the patterns of SNAP receipt from month to month. Results show that SNAP eligibility in a given month is associated with SNAP receipt in that month, even after controlling broad measures of income and eligibility during the year. The evidence suggests that transfer programs like SNAP have the potential to help directly reduce the financial insecurity felt by households.

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Introduction

For most poor households, poverty is not a fixed, chronic condition. Early studies using the Panel Study of Income Dynamics show frequent movement in and out of poverty across years (Duncan 1984). More recent studies using the Survey of Income and Program Participation find that most poverty spells last much less than a year (e.g., Edwards 2014). They show that the condition of poverty involves coping with variable and unpredictable income in addition to income that is simply insufficient.

One consistent result across both annual and monthly data sets is that income volatility is felt most sharply by poor households. While income spikes present households with chances to catch up on overdue bills and make postponed purchases, the dips, especially given the limited coping mechanisms of poor households, can present severe financial challenges that are not always evident in yearly data. It can be especially difficult for poor people to capitalize on income spikes and protect themselves from the dips.

Temporary, month-to-month poverty requires new perspectives. Most of the public support to help the poor is designed to pay for specific, approved expenses, such as food or medical care, rather than to support consumption generally. Moreover, eligibility criteria are often based on income measured at moments that may not be representative of other points during the year.
This paper draws lessons from the U.S. Financial Diaries project to relate intra-year income volatility to entry and exit from poverty, and to the availability of benefits from government transfer programs. The data track a year’s worth of financial transactions for 235 low-income and moderate-income households in four sites. The data is not nationally-representative but provide an unusually detailed record of income, spending, borrowing, saving, and sharing. Results show poverty spells even for middle-income households. They also suggest that income transfers do more to elevate average income than to provide a safety net against volatile income when it drops. Still, we find that the SNAP program is at least somewhat responsive to changes in monthly conditions, suggesting that it can be a way to address income volatility (Joliffe and Ziliak 2008). The evidence here supports the idea that to develop a policy agenda to encompass those who are sometimes poor, we need a stronger base for understanding the relationship between benefit receipt and temporary poverty.

Related Literature

Most analyses of household income volatility draw on data from the Panel Study of Income Dynamics (Duncan 1984, Bane and Ellwood 1986, Stevens 1994). The papers that focus on poverty commonly show that income volatility translates into relatively frequent movements in and out of poverty over time. Bane and Ellwood (1986), for example, use PSID data to measure episodic poverty. Using surveys from the 1970’s and 80’s, they find that nearly 45 percent of poverty spells lasted no more than a year, 70 percent lasted no more than three years, and just 12
percent stretched beyond a decade. They reported that about half of all poverty spells were attributable to major life events including family partition and divorce, job loss, and health crises.

Data from the SIPP show that between 2009 and 2011, 29 percent of Americans experienced poverty for two months or more between 2009 and 2011. Only 4 percent, however, were poor for the entire two years. Nearly 3 in 4 spells of poverty lasted a year or less, half lasted less than 7 months, and 44 percent lasted just 2-4 months. If we look only at one year (2011), 8.3 percent of Americans were poor every month of the year, but about one quarter of Americans spent two or months below the poverty line (Edwards 2014).

Census data further show that about 1 in 5 Americans live in “near-poor” households, with income above the federal poverty line but below 200 percent of the line. The households are particularly vulnerable to spells of poverty, and the fraction of the population has remained relatively steady for four decades. Those decades, though, have seen large changes in the labor market and how low-income households earn; many jobs now offer less security and less steady paychecks than in previous decades.

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2 Data are from page 11 of Mary Jo Bane and David Ellwood, “Slipping Into and Out of Poverty: The Dynamics of Spells.” *Journal of Human Resources* 21(1), Winter 1986: 1-23.

3 Most studies of temporary poverty focus on spells of at least two months in a row. Given the relatively short time frame of the diaries (most households were observed for a year only), we instead focus on spells as short as one month.

Temporary poverty deserves attention not least because income volatility has been on the rise (Dynan et al 2012), especially for the poorest. Hardy and Ziliak (2014) use the US Current Population Survey to examine the year-to-year volatility experienced by families between 1980 and 2009. They find that the richest 1 percent of the population saw the sharpest increase. But in any given year (rather than over the entire 19 years), income volatility for the poorest 10 percent was far greater for the poor than for the richest. And, because the poor had fewer tools to cope, it likely also had much bigger ramifications for their lives. At the same time, once-reliable strategies for coping were disappearing. Before 1990, the earnings of spouses were negatively correlated, meaning that spouses experienced earnings spikes and dips at different times, cushioning the family from dramatic volatility. But after 1990, that changed, Hardy and Ziliak showed. Spouses’ incomes often moved up or down at the same time, amplifying rather than decreasing spikes and dips. Moreover, while government support helped to reduce volatility for lower-income households, its role was less significant than it had been in the past.

New data from the Federal Reserve, Survey of Income and Program Participation, JP Morgan Chase Institute, and U.S. Financial Diaries project highlight the prevalence of month-to-month income volatility. As with the annual data, one consistent result across the intra-year data sets is that month-to-month volatility is felt most sharply by poor households (Hannagan and Morduch 2015, JMPCI 2015).

Morris et al (2015) assembled data for families with children across a 25-year span of the SIPP, beginning in 1984 and ending with the 2008 panel. Overall, month-to-month income volatility was relatively stable in that time. But two groups saw substantial changes. Volatility increased

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for the poorest 10 percent of households with children, while it fell for the richest 10 percent. Thus, over the past generation, the gap in income volatility between the poorest and richest grew by more than 400 percent, compounding income inequality. They find that the increase in month-to-month income volatility for poor households is mainly from unearned income (not job income), suggesting that the changes may be bound up with changes in the availability of public transfers. The changes do not seem to be due to changes in the racial or ethnic composition of the poorest households.

How well are benefits helping households that dip in and out of poverty? Hardy (2016) uses annual data from the Census’ Current Population Survey to find that the programs TANF, SNAP, and EITC dampened the growth in household income volatility from year-to-year since 1980. The programs, especially TANF and SNAP, had a larger effect for the poor. However, black families, female-headed households, and those in the very lowest quintile have not seen as large of a positive impact from these programs.

SIPP data lends itself to understanding the impact of safety net programs on within-year income volatility. Bania and Leete (2010) decompose income volatility due to earnings, public assistance, SNAP, WIC, and other income. They find that food stamp recipients had lower volatility than they would have had without the assistance, even as levels of income volatility increased for all groups between 1991 and 2001.
Data and Methods

We use data from the U.S. Financial Diaries project to add to evidence on the sources of poverty spells related to month-to-month income volatility. The U.S. Financial Diaries tracked the financial lives of 235 low- and moderate-income households for twelve months. The diaries are not actual journals filled out by respondents. Instead, the data were collected by field researchers who met with households every 2-4 weeks. The term “diaries” reflects the relatively high-frequency of data on financial transactions and events.

The focus of the diaries is on within-year cash flows with an attempt to capture every dollar spent, earned, borrowed, saved and shared (Morduch and Schneider 2013). Hannagan and Morduch (2015) describe the steps that were taken to ensure data quality.

Households were drawn from four research sites: New York City, Ohio/Kentucky, Eastern Mississippi, and San Jose/Central California. Together, the samples represent a variety of household characteristics and environments, but the households are not a representative sample. Moreover, the data are not weighted to reflect national population shares.

The study design led to a sample with a quarter of the households below the poverty threshold defined by the Census’s supplemental poverty line. The data, however, do not capture important parts of the American experience with poverty. Because the study focused on working families, households that didn’t have at least one employed member were excluded. As a result, the data
do not include people living in entrenched poverty. The diaries, however, allowed a new window on temporary poverty by providing high-frequency data over 12 months that includes income from all sources (with particular attention paid to income earned in cash and income earned in the informal sector). The aim was to capture more comprehensive, more reliable data than other surveys due to the high frequency of data collection and the trust developed between field researchers and participants.

Overall, 293,663 cash flows were collected for the 235 households, and 37 percent of spending was in cash (by dollar amount) on average. For poor households, the share was 44 percent. The average cash purchase size was $40, and the median was $10. By comparison, 16 percent of income was earned in cash, with a 59 percent share in some immigrant communities in New York City.

Analyzing volatility, poverty and the role of transfers

To normalize the data across regions, we compare household incomes to poverty thresholds defined in regional supplemental poverty measures (SPMs) (Short 2010). Income is thus expressed as a percentage of the SPM threshold, with poverty defined by having income under 100 percent of the SPM threshold. An important advantage of deflating by the SPM is that it controls for differences in regional cost of living.

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6 The eligibility criteria for our sample required participating households to have a source of earned income, but 3 percent of our households spent the year without a job and surviving on public support. Household members lost the jobs they held between being recruited and the study beginning, and did not find jobs during the time we followed them.
We use data aggregated to monthly income to calculate a coefficient of variation (CV) for each household’s over the year. We then measure poverty and investigate how the CV changes in response to benefits receipt. The CV is defined for each household as $CV = \sigma/\mu$, where $\sigma$ is the standard deviation of monthly income calculated household by household over the year, and $\mu$ is the mean monthly income for each household. The CV is often used in contexts like this because it allows comparisons of dispersion relative to a household’s average income; thus, unlike the variance, for example, the income variability of richer and poorer households can be compared directly.

We measure how the inclusion of government transfers in household income affects the CV by subtracting transfers from the total and comparing the post-subtraction CVs with pre-subtraction CVs. Reductions in the CV can be driven by decreases in the CV’s numerator ($\sigma$, the standard deviation) or by increases in the denominator ($\mu$, mean monthly income). Thus we further test what drives the effect of transfers on overall income CV. Reductions in the standard deviation would tell us that government transfers perform an insurance function by filling in monthly income when other sources (mainly earnings) are lower than average. On the other hand, transfers that reduce CV simply by raising average household income provide the household with more resources but do not directly counter the ups and downs of income. We analyze the roles of SNAP, unemployment insurance, public assistance (TANF), Social Security for old age, Social Security for disability (including SSD, SSI, and SSDI), veterans benefits, and tax refunds and credits (including EITC).
To test the relationships more comprehensively, we run a simple regression to gauge patterns of SNAP receipt from one month to the next. The explanatory variables distinguish between eligibility for SNAP based on average income during the year and an indicator variable that reflects SNAP eligibility in the given month. The key question is how responsive is receipt of SNAP to current conditions during the month versus the year.

证据来自美国金融日记

收入波动和贫困持续时间。美国金融日记的数据表明收入波动在较贫穷的家庭中更为普遍。测量月度收入波动的一种方法是观察收入与平均值的偏离程度。Hannagan 和 Morduch (2015) 计算每个家庭经历的收入峰值和谷值的次数，将峰值定义为收入至少比平均值高出25%的月份，将谷值定义为收入至少比平均值低25%的月份。收入低于当地贫困线的 households 在十二个月中，有七个月的收入可以被分类为峰值或低谷。不仅峰值和谷值频繁出现，而且它们的幅度较大。贫困家庭的收入波动比较好的家庭更大。例如，近贫家庭（收入在贫困线附近但不超过1.5倍的贫困线）的平均峰值为2.7次，谷值为2.4次。虽然不稳定仍然是一个问题，但远不如对贫困家庭那样严重。

《美国金融日记》数据说明，大多数贫困家庭在研究年内并不是一直处于贫困状态。如图1所示，只有9%的贫困家庭始终处于贫困状态。
The other 91 percent saw their incomes rise above the line an average of three months during the year. Even after removing income spikes due to tax refunds and credits, about three-quarters (77 percent) of those judged poor by annual incomes still had months when they were not poor.

More striking is the experience of “near-poor” households. Nearly all of these households in our sample were sometimes poor as well. Approximately 97 percent of those living on annual incomes near the poverty line (between the poverty line and 1.5 times the line) spent at least one month in poverty. And that was also true for 41 percent of those earning more than twice the poverty line, people whose incomes put them close to the local median.

The number of months that the poor versus the near-poor spent in poverty varied. Those near-poor families who spent any time below the poverty line spent an average of 4 months in

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7 The length of time under the poverty line was calculated using the supplemental poverty line definitions. The data on months spent below the line are conditional on spending at least one month below the line (The Census definition of a poverty spell is a minimum of two months).
poverty, while the highest income group in the sample, those with incomes above twice the poverty line, spent 1.6 months in poverty.

The role of transfer income. How much does transfer income help to mitigate the income volatility experienced by households in the U.S. Financial Diaries sample? We examine the effect of seven categories of benefits: food stamps (SNAP), unemployment insurance, public assistance, social security for old age, social security for disabilities, veterans benefits, and tax refunds and credits. As shown in Figure 2 and Table 1, all non-tax benefits decreased income volatility in the sample overall. Without them, the sample’s average income CV would be up to 0.03 points higher than the baseline of 0.57. The inclusion of SNAP reduces income CV more than transfer types, while the inclusion of veterans benefits, public assistance (TANF), and unemployment insurance reduce CV the least. The inclusion of income from tax refunds and credits has the opposite effect in that it increases the sample’s average income CV. This result is unsurprising because the vast majority of households received this income as a single volatility-inducing spike in a month shortly after filing annual taxes.
Figure 2. Seven different benefits’ effects on income volatility.

Are transfers dampening volatile incomes as the income CV analysis suggests? We decompose the effects of changes in income means and variances that both are altered with the addition of a given benefit. Table 1 presents results. It shows that changes in the CV are largely being driven by changes in mean income, not by changes in the standard deviation. In other words, government benefits are not predominantly serving as insurance by filling in gaps when monthly income is particularly low. Instead, they help mainly by helping recipients increase average income levels. (The one exception is income received from tax refunds and credits, normally in the form of a lump sum provided after households file annual income taxes. As expected, this lump sum has the opposite overall effect on income CV, increasing CV on average. The last row of Table 1 illustrates how the tax refund/credit effect on income CV is driven mainly by increasing the variance of monthly income.)
<table>
<thead>
<tr>
<th>Benefit Removed</th>
<th>Mean CV</th>
<th>% change CV</th>
<th>% change standard deviation</th>
<th>% change mean</th>
<th># households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income as-is</td>
<td>0.56</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>235</td>
</tr>
<tr>
<td>SNAP removed</td>
<td>0.60</td>
<td>6%</td>
<td>- 0.02%</td>
<td>- 5%</td>
<td>235</td>
</tr>
<tr>
<td>Unemployment removed</td>
<td>0.58</td>
<td>2%</td>
<td>0.05%</td>
<td>- 1%</td>
<td>235</td>
</tr>
<tr>
<td>Public assistance removed</td>
<td>0.58</td>
<td>2%</td>
<td>0.03%</td>
<td>- 1%</td>
<td>235</td>
</tr>
<tr>
<td>Social security (old age) removed</td>
<td>0.59</td>
<td>5%</td>
<td>- 0.05%</td>
<td>- 3%</td>
<td>235</td>
</tr>
<tr>
<td>Social security (disability) removed</td>
<td>0.59</td>
<td>5%</td>
<td>- 3%</td>
<td>- 5%</td>
<td>235</td>
</tr>
<tr>
<td>Veterans benefits removed</td>
<td>0.57</td>
<td>1%</td>
<td>- 0.6%</td>
<td>- 0.4%</td>
<td>235</td>
</tr>
<tr>
<td>Tax refunds and credits removed</td>
<td>0.45</td>
<td>- 16%</td>
<td>- 22%</td>
<td>- 9%</td>
<td>235</td>
</tr>
</tbody>
</table>

Table 1. Summary of different benefits’ effects on income volatility. Eliminating most benefits from monthly income increases average income CV, indicating that including benefits in aggregate income lowers CV on average. This benefits effect drives lower CVs by boosting mean monthly income rather than by decreasing the variance of monthly income.

*The role of SNAP.* Most transfers are helpful, but not because they help households fill in their income dips. Thus one might expect to see a positive association between income level and transfer receipt from month to month. We test this hypothesis using cash flow data on SNAP receipt in U.S. Financial Diaries households. We focus on SNAP because it has emerged as one of the key transfer programs with the potential to address volatility (Bartfeld et al 2016). As a dependent variable we measure a binary indicator of whether or not SNAP was received in a given month. Our model measures the association between this indicator and SNAP eligibility in the same month, conditioning on each household’s annual or average SNAP eligibility. The
independent variables used to measure SNAP eligibility are also binary indicators equal to 1 when household income is below 130 percent of the federal poverty line.

We use this new income estimate based on the federal poverty line’s definition – in contrast to the supplemental poverty measure definition that has guided the analysis so far – for two reasons. First, income as measured by the federal poverty line is a main determinant of SNAP eligibility. That is, reporting a gross income below 130 percent of the federal poverty threshold is required to gain access to SNAP in most states (U.S. Department of Agriculture 2016). Secondly, the definition of gross income going into this measure controls for endogeneity in the model because, unlike the supplemental poverty income definition, it excludes SNAP from income totals.

Table 2 presents results. The basic model regresses monthly SNAP receipt on whether households were SNAP-eligible in the month – that is, whether their income fell below 130 percent of the federal poverty line – and on whether household were SNAP-eligible on average during the year they participated in the diaries. The first two specifications contain logistic regressions and the second two contain linear regressions. Both logistic and linear results include one specification that controls for overall income level, both in the month and on average during the year. Income is measured using a continuous ratio of gross income divided by the federal poverty line.

The table indicates that households who are eligible for SNAP on average are more likely to receive the transfer in any given month, and that households with higher annual income levels
are less likely to receive SNAP in a given month. Both of these results are consistent with
decisions about SNAP eligibility being based on average annual income.

Table 2. Likelihood of receiving SNAP in any given month is slightly higher on average for
households who are eligible for SNAP in that particular month.

<table>
<thead>
<tr>
<th></th>
<th>Logit</th>
<th>Logit</th>
<th>OLS</th>
<th>OLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNAP eligible (mo)</td>
<td>0.432***</td>
<td>0.220</td>
<td>0.0711***</td>
<td>0.0522*</td>
</tr>
<tr>
<td></td>
<td>(3.70)</td>
<td>(1.59)</td>
<td>(3.75)</td>
<td>(2.43)</td>
</tr>
<tr>
<td>SNAP eligible (yr)</td>
<td>1.819***</td>
<td>0.973***</td>
<td>0.357***</td>
<td>0.282***</td>
</tr>
<tr>
<td></td>
<td>(15.56)</td>
<td>(6.40)</td>
<td>(18.32)</td>
<td>(12.42)</td>
</tr>
<tr>
<td>% Federal poverty</td>
<td>0.0997</td>
<td>0.0131</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line (mo)</td>
<td>(1.43)</td>
<td>(1.50)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Federal poverty</td>
<td>-0.929***</td>
<td>-0.0756***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line (yr)</td>
<td>(-7.30)</td>
<td>(-5.93)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-2.080***</td>
<td>-0.316</td>
<td>0.107***</td>
<td>0.254***</td>
</tr>
<tr>
<td></td>
<td>(-26.81)</td>
<td>(-1.30)</td>
<td>(10.81)</td>
<td>(9.40)</td>
</tr>
</tbody>
</table>

Observations 2763

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Results also show that SNAP eligibility in a given month is positively associated with SNAP
receipt in that month. The coefficient on the monthly SNAP eligibility variable loses some
significance after controlling for income level. Still, the OLS specification controlling for income
level predicts that households on average are 20 percent (5 percentage points) more likely to
receive SNAP in months when they are eligible for it than in months when they are not, whether
or not they are eligible for SNAP on average across the year. In contrast to the idea presented
above, that SNAP and other transfers do not dampen income volatility as much as they raise
average income levels, our model suggests that SNAP receipt is at least somewhat responsive to
month-to-month changes in income.
Conclusion

Evidence from the U.S. Financial Diaries presented here gives a mixed picture on how well government benefits combat the income volatility that causes households to move in and out of poverty during the year. The data show that transfers mainly increase income rather than directly reduce the variability of income. Regression analysis, however, shows that SNAP is sensitive to conditions in a given month, even when controlling for income (and SNAP eligibility status) judged over the year.

The persistence of episodic poverty suggests that additional solutions are needed. For families with volatile income, the financial mechanisms to cope with ups and downs are primarily saving, borrowing, and sharing with others. Often, the agenda of those who seek to reduce poverty and the agenda of those who seek to help people better manage their financial lives are distinct. But, in fact, we see that they overlap.

The data gathered to determine benefits eligibility does not necessarily capture cash flow information, nor generate sufficient insight about financial instability. As a result, we know relatively little about the way that government transfers interact with households’ broader financial options and challenges. New data that tracks cash flows are needed if we are to begin to develop policies more responsive to the needs of the millions of Americans moving in and out of poverty.
REFERENCES


