Where Is the Missing Credit Card Debt? Clues and Implications

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Abstract: *A casual comparison of industry and household data sets suggests that households underreport credit card borrowing by a factor of three. Unobserved heterogeneity in borrower underreporting would complicate inference on relationships between credit card use and other behaviors, such as financial distress, consumption paths, or portfolio choice. This paper offers some reassurance and several new stylized facts. Accounting for differences in definitions between household and industry measures reduces debt underreporting to a factor of two. Underreporting is less severe for general-purpose than for other cards. The true underreporting factor has remained stable over 15 years even as 26 million households entered the market. Households report charges and account holding relatively accurately.*

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I. Introduction

A casual comparison of household and industry data sources suggests that households underreport their credit card borrowing by a factor of three. This is an unsettling prospect for researchers and policymakers who wish to use microdata to study household credit card use. The motivation for such studies spans many literatures in macro- and microeconomics, since credit cards are plausibly the marginal source of borrowing and consumption for most U.S. households.[1] Consequently, credit card use is an important component of modeling household consumption and portfolio decisions over both the short run and the long run. Unobserved heterogeneity in underreporting would complicate inference on such relationships.[2]

Researchers draw on two main sources for measuring credit card use. The Federal Reserve Board of Governors' Statistical Release on Consumer Credit (G.19) collects data from issuers of consumer credit cards (lenders). The available evidence suggests that the G.19 accurately reflects outstanding debt owed to issuers (Furletti and Ody, 2006). The Survey of Consumer Finances (SCF) collects data from credit card users (households). Aggregating the SCF's measure of revolving credit card debt and comparing it to the G.19's measure of revolving credit outstandings suggest that SCF households underreport credit card borrowing by a factor of three (Table 1, Column 12).[3]

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[1] The 2004 Survey of Consumer Finances finds that 72 percent of U.S. households hold a general-purpose credit card. In contrast, only 12 percent had a home equity line of credit. Average use of credit card credit limits was only around 20 percent. (www.nationalscoreindex.com/NSI_Site/USScore.aspx; *The Nilson Report*, No. 705, 1999).

[2] For example, borrower underreporting of credit card debt may be correlated with imperfectly observed components of preferences or lifetime income that are, in turn, correlated with the behavior or outcome of interest (e.g., financial distress, consumption patterns, wealth accumulation, or asset allocation). This would produce biased estimates of the relationship between credit card borrowing and the dependent variable of interest in the likely case that there is no valid instrument for credit card borrowing.

[3] Avery, Elliehausen, and Kennickell (1988) and Antoniewicz (2000) are among several papers comparing the SCF to aggregate data sources (e.g., the Flow of Funds) that do not deal with credit card debt specifically.

I show that about one-third of the wedge between SCF and G.19 estimates is due to definitional differences. The G.19 measure of *outstandings* includes several types of credit card use that are excluded from the SCF measure of credit card *revolving* debt by design. These include float (as other researchers have recognized),[4] business use of personal cards, and noncredit card lines of credit. Accounting for the definitional differences reduces SCF underreporting of credit card balances to a factor of two. Households seem to report *more* of their general-purpose card debt (principally Visa, MasterCard, and Discover) than their store-specific and gas station card debt.

Perhaps most important, the true SCF underreporting factor seems to be fairly stable over the time frame when the SCF and G.19 can be rendered comparable (1989 to 2004). The true underreporting factor has hovered around two even as 26 million households entered the general-purpose credit card market during this period and even as the proportion of credit card debt held on general-purpose cards rose from 0.74 to 0.88. The stable underreporting factor is consistent with homogeneity in household underreporting behavior.

I also show that households report other margins of credit card use relatively accurately. SCF credit card charges match up essentially one for one with industry aggregates after adjusting for definitional differences. The number of accounts can also be reconciled. Households report substantially fewer total accounts than issuers do, but the gap narrows to a factor of less than 1.5 if one compares household reports to the number of *active* accounts in industry data. The remaining gap seems to be due to definitional differences relating to business use.

Identifying *why* households underreport credit card balances or why households seem to report charges and account holdings relatively accurately is a difficult task, and I only speculate. It may be that balance reporting is depressed by one or more factors (e.g., stigma, survey fatigue,

[4] See, for example, Gross and Souleles (2002), Johnson (2007), and Laibson, Repetto, and Tobacman (2005).

forgetfulness, or limited attention to spouse's cards) that are relatively homogeneous across the population. Or it may that the absence of a time trend in balance underreporting obscures important heterogeneity at the micro level.

I merely note that the results here offer some reassurance to researchers using household-reported data on credit card use. Debt underreporting is less severe than previously believed. It appears to be least severe for the cards that are most often the marginal source of credit — general-purpose cards. Self-reports on transaction volume and account holding match up relatively well with industry data. Perhaps most important, reporting patterns have changed little over time even as the characteristics of the marginal cardholder have changed and as credit card borrowing and penetration have increased substantially. The time pattern is consistent with households' (under)reporting homogeneously and hence with the SCF's permitting unbiased inference on the relationships between credit card use and other behaviors and outcomes of interest.

II. Data Sources and Study Period

I focus on three data sources. The primary industry source on credit card debt is the Federal Reserve Statistical Release G.19: Consumer Credit (G.19). Furletti and Ody (2006) detail the sampling procedures used to construct the monthly G.19 monthly estimate. Many components of the G.19 are based on regulatory reports that are integral to safety-and-soundness supervision and, therefore, should be extremely accurate. Some components are easily benchmarked against other trade industry sources. Overall, Furletti and Ody conclude that the G.19 is accurate.

The G.19 takes a snapshot estimate of outstandings (amounts owed to credit card issuers) on all consumer credit card accounts at month end, making the appropriate adjustments so that securitized receivables do not get double-counted. G.19 credit card outstandings comprise

(though they are not easily disaggregated into) three categories: those cards that can be used at many different merchants (general-purpose cards),[5] those that can be used only at a particular store or chain (store cards), and those that can be used at particular fueling stations (gas cards). The G.19 also includes amounts owed on nonmortgage personal lines of credit that are not issued through credit cards (e.g., prearranged overdraft plans or check-accessed lines of credit). The G.19 releases report a revolving "total" that includes both credit card and noncredit-card debt. As detailed below, disaggregating credit card debt from the total is straightforward.

The G.19 does not provide any information on credit card charge volume or account tallies, so I combed various issues of the *Nilson Report* for issuer-side data on these margins. Unlike the G.19 and SCF, Nilson data vary in content and format across years. Consequently I reviewed every issue in the year following the comparison years in my sample (e.g., 2005 issues for 2004 data) for data that might be informative. Nilson does not provide details on its sampling procedures but is believed to deliver accurate estimates of credit card use; for example, the Board of Governors uses Nilson data as one source in constructing the store card and gas card components of G.19 outstandings. One difference between Nilson and G.19 data on outstandings is that Nilson totals include "commercial" (business) accounts; this is true for Nilson data on charge volume and account tallies as well.

The Survey of Consumer Finances (SCF) is the household-level data source used in my comparisons. It is the most comprehensive nationally representative source of data on credit card use and household finance more generally.[6] The SCF is conducted every three years and surveys

[5] General-purpose cards are offered by the Visa, MasterCard, Discover, and American Express brands/networks, and most have revolving credit features. A small fraction of general-purpose card activity is on "charge cards" (issued principally by American Express) that do not have revolving features — each month's balance must be paid in full. My tabulations include or exclude charge cards from the general-purpose category depending on data availability, with the notes to each table providing the requisite details.

[6] See Bucks, Kennickell, and Moore (2006) for more details on the SCF.

around 4,000 households each wave. I focus on the 1989-2004 SCFs because earlier G.19s did not capture large swaths of outstandings.[7] There is no panel component to the SCF during this period. For each type of credit card use I construct aggregate estimates by inflating each household by its SCF-assigned population weight (variable x 42001).[8]

The SCF questions and prompts are nearly identical across the six different surveys during my study period. The survey collects the data of interest, starting with a question on whether anyone in the household has any credit cards or charge cards (with a prompt to distinguish these from debit cards). For respondents who answer yes, the surveyor then asks five yes/no questions about whether anyone in the household has any of five different types of cards (general-purpose revolving, store, gas, general-purpose charge, other). Following each yes answer, respondents are asked how many *accounts* they have of that type, and they are specifically instructed to "not count duplicate cards on the same account or any business or company accounts" (see, for example, the 2004 SCF codebook). Respondents reporting one or more accounts for a given type of card are then asked: "On your last bill(s), roughly how much were the new charges made to this/these account(s)?" and "After the last payments were made on this/these account(s), roughly what was the balance still owed on these accounts?" These produce account type-level measures of what I label "recent charges" and "revolving debt."

As detailed further in the next section, the SCF definitions of credit card debt, charging, and account holding differ in important ways from those used in industry sources. The SCF and industry measures often viewed as summary statistics for "borrowing" (or "charging" or "account

[7] The modern SCF started in 1983 and began its triennial repeated cross-section sampling in 1989; consequently, the only candidate for a pre-1989 comparison would be 1983. But the 1983 G.19 omits general-purpose cards issued by financial institutions other than commercial banks, many important issuers of store cards, and charge cards (*The Nilson Report* No. 339).

[8] The 1989-2004 SCFs use multiple imputation and provide five implicates for each household. I adjust for this by dividing each weighted-up estimate by 5.

holding") measure (slightly) different aspects of credit card use. Obtaining comparable estimates of each behavior of interest requires some adjustments for differences in definitions. I create comparable estimates for each behavior below.

Section III. Comparisons of Household and Industry Data

Borrowing

Table 1, Panel A presents the adjustments needed to produce comparable estimates of revolving credit card debt in the SCF and G.19.

Since the G.19 captures all personal credit cards, I start by aggregating the SCF revolving debt responses within household and across the five account types to get the total credit card revolving debt reported for each household. Then I aggregate across households using population weights (as detailed in Section II). This produces the estimates in Panel A, Column 1. Unsurprisingly, the aggregates have relatively small standard errors, so I focus only on the point estimates.

Column 2 presents the first adjustment, which is for business-related revolving debt on personal cards. The G.19 includes all personal credit cards; in contrast, recall that the SCF instructs respondents to "not count…. any business or company accounts." This implies that the G.19 includes some outstandings on personal cards that are used for business purposes and excluded by design from the SCF. I add an estimate of such outstandings to the SCF revolving number using the 1998 and 2003 Survey of Small Business Finances (SSBFs). The SSBF asks: "On average, what is the balance of business charges on all owners' personal credit cards after payments are made?" The 1998 survey refers to credit card use in 1998; the 2003 survey refers to card use in 2004. I interpolate (extrapolate) the 1998 and 2004 results to get an estimate for 2001 (1995).

The adjustment is quite small: only $1 billion to $7 billion, or 1 to 3 percent of unadjusted

SCF revolving balances. These magnitudes are probably too conservative because the SSBF does not represent many types of businesses where personal cards are used. *The Nilson Report* (various issues) finds that many large businesses provide cards that are in employees' names; these may be counted as personal cards in the G.19. Moreover, the SSBF *represents* only the 6.3 million small businesses in Dun's Market Identifier file, while the *Nilson Report* (No. 772) states that over 20 million small business owners *used* personal cards for business purposes in 2002. Unfortunately, I could not find any evidence that would permit a more accurate (and presumably larger) adjustment, although one can use Nilson's data to bound the true adjustment at something less than $51 billion for 2001.[9]

Column 3 presents the next adjustment, which is for recent charges on personal cards. Recall that whereas the SCF revolving balance estimate includes only balances after the last bills were paid, the G.19 takes a snapshot of current debt outstanding. Thus, the G.19 includes "transaction balances" that include both float and "borrowing-to-charge" (charges since the last payment on accounts that were not paid in full). Making the SCF and G.19 comparable requires adding an estimate of recent charges to the SCF revolving estimates. To fix the idea, it helps to think of this as an estimate of charges incurred by households since their previous billing cycles closed.[10] Estimating recent charges requires assumptions about what is presumably a saw-tooth pattern (on average at least) of charging up and (partially) paying down from cycle to cycle.

As detailed in the Appendix, my middle-of-the-road adjustment for recent charges takes

[9] The *Nilson Report* (No. 776) estimates a total of $51 billion in business-related outstandings across both personal and commercial cards for year-end 2001. Recall that commercial cards are excluded from both the SCF and G.19. I could not find any other estimates that isolate the personal component of the $51 billion.

[10] A thought experiment further illustrates the point. Suppose the U.S. consisted of one household with one credit card on which it transacts but never revolves debt. Its statement cycle runs from the first to the end of the month; after a cycle closes, a bill is produced (specifying the minimum payment) that is due on the 25th of the second month. During those 25 days, the household continues to use the card, building up a balance nearly twice as large as the balance at the end of month one. When the household pays on the due date (say, by auto-debit), the household will already owe the bank for about five-sixths of the charges it will owe on the next bill. When the SCF surveyor shows up and asks what the balance was after the household's last payment, the answer is zero.

Nilson estimates of annual charge volume on personal cards (excluding commercial accounts), divides by 12 to get the average month, and adds this to the SCF revolving total.[11] Column 4 simply sums the SCF revolving estimate and the two adjustments in Columns 2 and 3.[12]

The Column 4 estimates can then be compared to total G.19 revolving outstandings (Column 6) that are adjusted (in Column 5) by subtracting noncredit card, nonmortgage lines of credit (reported in Column 7). I estimate noncredit-card revolving debt using two different methods. For 2001 and 2004 the Call Reports provide the separate line item needed to back out the noncard debt from the issuer side.[13] Before 2001 this level of disaggregation did not exist in the Call Reports, so I use the SCF. Identifying noncard, nonmortgage revolving debt using SCF questions is straightforward. But these products have low prevalence in the SCF, and consequently, aggregate estimates using the SCF may be influenced heavily by outliers (Bucks, Kennickell, and Moore, 2006). Results from the two years that have data from both the Call Reports and the SCF give credence to the outlier concern; the estimates match almost perfectly ($28 billion vs. $29 billion), while the 2004 estimates do not ($62 billion vs. $32 billion).

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[11] One could equally well use the SCF questions on recent charges instead of the Nilson data to construct the adjustment — Table 2 will show that the SCF and Nilson deliver almost identical estimates when rendered comparable — but the Nilson measures are more comprehensive. Hence, the Nilson number requires fewer adjustments before it can be added to the SCF revolving number to create an estimate of outstandings that is definitionally comparable to the G.19, and this makes exposition in the table easier.

[12] There is one data point from Nilson suggesting that this adjustment for new charges is too small. My adjustment adds $109 billion in transaction balances to the 2001 SCF revolving total. An alternative adjustment would be to subtract an estimate of the average amount of outstandings that are paid off before accruing finance charges. The *Nilson Report* (No. 776) gives such an estimate for 2001 year-end outstandings: $171 billion. But to make this number definitionally comparable to the G.19 one would need to subtract the commercial account component. As discussed above we know that this is bounded above at $51 billion for 2001 (or $46 billion, if we subtract the SSBF estimate for business use of personal cards). So this suggests an adjustment of at least $171b - $46b = $125b, which is greater than the $109 billion used in Table 1.

[13] All unsecured revolving loans issued by banks and thrifts that file Call Reports and finance companies that file domestic finance company reports (DFCR) are included in the G.19. For entities that file Call Reports, these loans are separately reported on Call Report Schedule RC-C under RCONB539. These loans are not disaggregated from credit card loans for finance companies, so I assume they appear in the same proportion as for banks. Noncredit card unsecured revolving loans issued by thrifts that file thrift financial reports (TFR) or credit unions are included within

Consequently, my noncard debt adjustments for 1989-1998 must be viewed skeptically.

Column 8 takes the ratio of the adjusted comparable measures of borrowing from the G.19 (Column 5) and the SCF (Column 4). This column shows that this "SCF underreporting factor" appears to be stable over time: It was 1.9 in both 1992 and 2004 and has not exceeded 2.3 during over the 15-year sample period. The minimum value of 1.6 in 1989 may be due to an excessively large estimate (noisily produced from the SCF, as described above) of noncredit card, nonmortgage revolving debt.

The absence of a clear trend in the underreporting factor is noteworthy given the changes in the credit card market documented in Columns 4, 5, and 10 of Table 1 and in Appendix Table 1. The factor remained stable even though real card debt grew 250 percent and even as 26 million households acquired general-purpose cards for the first time (that is, as the proportion of households holding a general-purpose card rose from 0.57 to 0.72). The increased penetration of general-purpose cards (recall these are principally Visa, MasterCard, and Discover) is noteworthy even as the proportion of households holding *any* credit card remained roughly constant (Column 9), because general-purpose cards represent a large and increasing proportion of card debt throughout the sample period (Column 11). Appendix Table 1 suggests that the general-purpose cardholders entering the market between 1989 and 2004 had some characteristics that were different from those of the infra-marginal cardholders. Marginal cardholders tended to be poorer and have less stable jobs and were more likely to be minority, female, and unmarried.

This importance of general-purpose cards raises the question of whether underreporting is different across different types of cards (Table 1 Panel B). It is not possible to disaggregate the G.19 by card type with any precision, so I compare the SCF to Nilson data instead. Two

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the nonrevolving portion of the G.19 and therefore do not need to be subtracted here to produce comparable estimates. See Furletti and Ody, pp. 23-34, and Appendix I for more details.

additional adjustments are required to render SCF revolving debt comparable to Nilson outstandings. First, Nilson includes commercial accounts, so one needs an estimate of business-related outstandings that spans commercial as well as personal accounts. As discussed above I could find this for 2001 only. Second, Nilson reports outstandings at year-end, while the SCF is conducted throughout the year (mostly May-December). Seasonality and secular growth motivate a slight adjustment for this timing difference, so I deflate the Nilson number by 0.96, the ratio of the September 30 to year-end G.19 outstandings.[14]

Panel B Column 6 shows the result of the adjustments: the SCF underreporting factor for general purpose card debt is 1.9 in 2001. Given that general purpose cards held an estimated 86% of card debt in 2001 (Panel A Column 11) and a total underreporting factor of 2.3 (Panel A Column 8), this suggests that underreporting may be substantially *less* severe for general purpose card debt than for store or gas card debt.[15]

Recent Charge Volume

Table 2 compares recent charge volume as measured by the SCF and Nilson. Column 1 starts by presenting the weighted-up estimate of total recent charges reported in the SCF. As with borrowing, I construct this by first aggregating charges across account type within household, and then by using the population weights to aggregate across households. Again the standard errors on the SCF aggregates are relatively small, and I focus on the point estimates.

Columns 2, 3, and 8 adjust for the presence of business-related card volume in Nilson but not the SCF. The available data in Nilson vary by year. For 1989 and 1992 there is a statistic that

[14] Panel C shows that Nilson and the G.19 deliver similar estimates of total outstandings that are within 3 percent of each other; much of the $20 billion discrepancy is probably due to the fact that my adjustment for commercial outstandings (Panel C, Column 6) is crude and too large for reasons detailed above.

[15] One explanation for relatively severe underreporting on gas and store cards may be greater prevalence of no interest, no-payment promotions. I was not able to find data on the prevalence of such offers, but it is known, for example, that Home Depot and Lowe's have been running such promotions dating back to at least 2000 (*Credit Card*

captures all business-related uses (Column 3). In other years I found only commercial account volume (Column 8) and complement this with an adjustment for business-related personal card use based on SSBF data (Column 2).[16]

Column 7 shows the impact of an assumption that the SCF recent charge questions do not capture cash advances (from ATMs, checks, or balance transfers). This is motivated by the fact that the SCF does not specifically mention or prompt for balance transfers. The volume of cash advances has grown over time and hence this assumption becomes more critical in recent years.

Columns 4 and 5 show that my adjustments make the SCF and Nilson estimates match up essentially one for one. It is possible that the adjustments err by a few percent in either direction. The SSBF adjustment almost certainly underestimates the true business-related charge volume on personal cards, for reasons detailed above in the discussion of outstandings.[17] A more accurate estimate would end up increasing the ratio (adjusted Nilson/adjusted SCF), all else equal. On the other hand, it might be wrong to exclude (all) cash advances from the Nilson number. A more accurate estimate would end up decreasing the Nilson/adjusted SCF ratio, all else equal. The fact that both of these adjustments are small to begin with and that potential errors in the adjustments push in opposite directions strengthens the conclusion that SCF and Nilson charges match up almost perfectly. Panel B shows a similar pattern when restricting the calculations to general-purpose cards only.

Management, 2005).

[16] I use the response to the SSBF question: "On average, about how much per month in new business expenditures does the firm charge to owners' personal credit cards?"

[17] The sense that the SSBF adjustment is too small is supported by the fact that my estimate of SSBF + Nilson commercial charges for 1995 (Column 2 + Column 8) is no greater than Nilson's estimate of total business-related volume in 1992 (Column 3), despite the fact that there has been a strong upward trend in the use of cards by businesses.

Account Holding

Table 3 presents estimates of account tallies from the SCF and Nilson. Here both data sets permit disaggregation by card type, so I report results separately for general-purpose, store, and gas cards. The critical distinction is that while Nilson distinguishes between active (billed recently) and inactive accounts, the SCF does not.

The results on general-purpose cards (Columns 2, 3, and 5) suggest that SCF households underreport account holdings. The question remains by how much. If one assumes that households report only active accounts — which seems reasonable, given that inactive accounts may be forgotten, perceived as closed, or may actually have been closed by the respondent[18] — the gap is small but nontrivial (for example, 70 million accounts and an underreporting factor of 1.3 in 2004).[19]

A large portion of general-purpose account underreporting is almost certainly due to business-related accounts that are excluded from the SCF but included in the Nilson tallies.[20] As noted above, *Nilson Report* No. 772 states that over 20 million small businesses use personal cards. *Nilson Report* Nos. 837 and 840 show 30 million commercial accounts with Visa and MasterCard alone; adding American Express, which had a commercial charge volume market share of 40 percent, would most likely bring the total to around 50 million commercial accounts. So it seems likely that at least 70 million business-related accounts (20 million personal accounts

[18] Issuers occasionally report closed accounts as inactive because of clerical errors.

[19] Two pieces of evidence suggest that this assumption is a bit strong: SCF households do in fact report some inactive accounts. First, most SCF store and gas card counts (Columns 7 and 10) exceed the Nilson active counts for store and gas cards (Columns 8 and 11). Second, the SCF data suggest that between 5 and 7 million households report having general-purpose accounts, even though their total balance and recent charges on all general-purpose accounts are zero. The Nilson definition of "active" is vague, but it seems likely that many of these SCF accounts would be classified as inactive.

[20] A small portion of the account gap is due to SCF top-coding. Table 3, Column 1 reports that proportion of weighted households at a top-code for any type of account; only about 1 million weighted households were at the top-code of 10 general-purpose cards in 2004.

used for business + 50 million commercial accounts) are included in the Nilson counts but excluded from the SCF counts. Thus, nearly all of the gap between the SCF and active Nilson counts (Columns 2 vs. 3) appears to be due to business-related exclusions from the SCF.

The hypothesis that much of the underreporting of general-purpose card accounts is due to business-related accounts is supported by the fact that SCF tallies on store and gas cards (where business-related accounts are very rare) match up relatively well with the number of active accounts in Nilson. Columns 7 and 8 show that SCF households have reported something close to the number of Nilson active store accounts since 1992. Columns 10 and 11 show that 2001 and 2004 SCF households reported 5 million more gas card accounts than the active tally in Nilson. The SCF-Nilson active difference has narrowed significantly over time.

In all, the data suggest that nearly the entire gap between SCF and Nilson account tallies is due to the exclusion of inactive and business-related accounts from the SCF.

IV. Conclusion

I create comparable measures of aggregate credit card use based on household and industry data and find that households underreport credit card debt by a factor of 2. In contrast, aggregate credit card charges and account totals match up relatively well across household and industry data sources. Underreporting of household debt is less severe for general-purpose cards than for store and gas cards. The underreporting factor has been relatively constant over time, even as credit card debt grew by 250 percent and 26 million households entered the general-purpose credit card market. The results do not *rule out* heterogeneity in reporting behavior that would confound statistical inference, but the aggregate pattern is at least *consistent* with homogeneity in underreporting behavior. Consequently, the results offer some reassurance for researchers interested in using micro data to study the role of credit card use in households' finances and their financial conditions.

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Appendix

Adjusting G.19 Outstandings with an Estimate of New Charges

Recall that the SCF revolving balance estimate includes only balances after the last bills were paid. The G.19 takes an end-of-month snapshot of current debt owed to issuers. Consequently, the G.19 includes "transaction balances" that include both float and "borrowing-to-charge" (charges since the last payment on accounts that were not paid in full). To make the SCF and G.19 comparable, we need to add an estimate of recent charges to the SCF revolving estimates; to fix the idea, it helps to think of this as an estimate of charges incurred by households since their previous billing cycles closed.

Credit card issuers distribute their customers' billing cycles evenly over a month. Therefore, the total outstandings owed to credit card issuers at the end of any month is approximately the sum of average daily balances across consumers.[21]

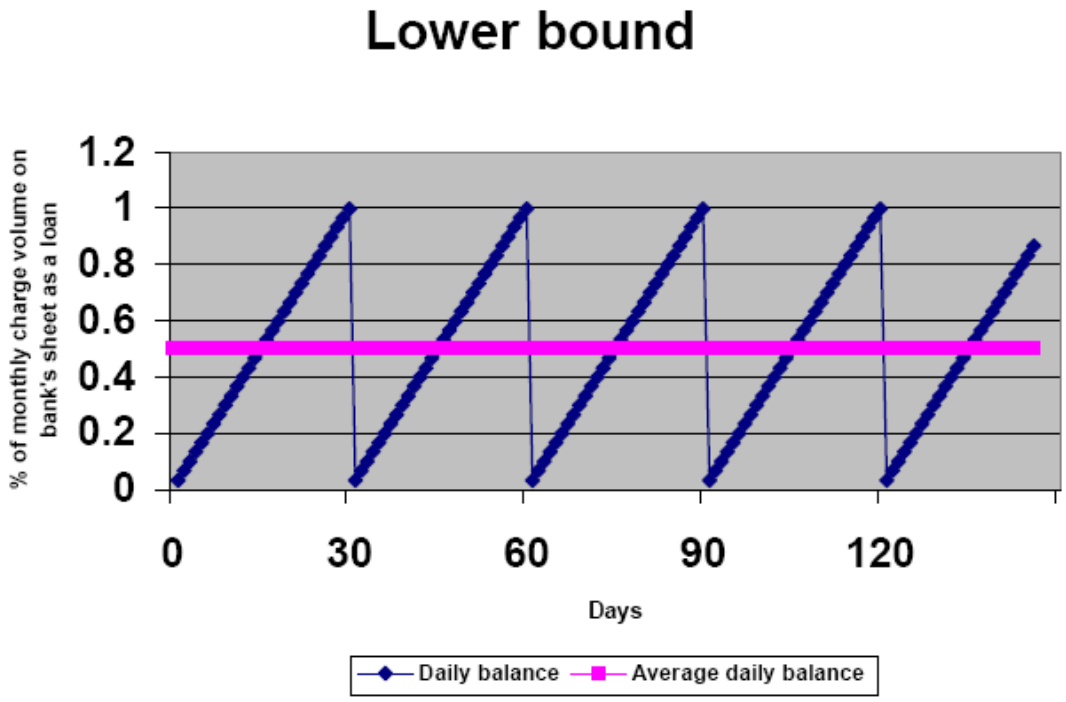
Outstandings, and hence average daily balances, can be mapped into one another using two distinct components. The first component is revolving balances, as in the SCF measure. These map dollar for dollar into average daily balances. The second is "transaction balances": new charges that cardholders incur but pay off in full every month. The proportional mapping of transaction balances into average daily balances depends on the amount of time elapsed between the incurring and paying off of transaction balances.

There are two reasons that $1 in transaction balance need not map to $1 in average daily balances. First, transactions may not be distributed evenly throughout the billing cycle. Second,

[21] A comparison of Call Report variables RC-C RCONB538 and RC-K RCONB561 confirms that other than the seasonal Christmas trend, the average daily outstandings of banks are similar to the end-of-quarter snapshot.

most issuers provide customers with a 25-day grace period.[22] The grace period is the number of days after the end of a customer's billing cycle before the lender starts charging interest. To illustrate the importance of carefully considering alternative patterns of transaction use, I illustrate upper and lower bound estimates before proposing a midpoint.

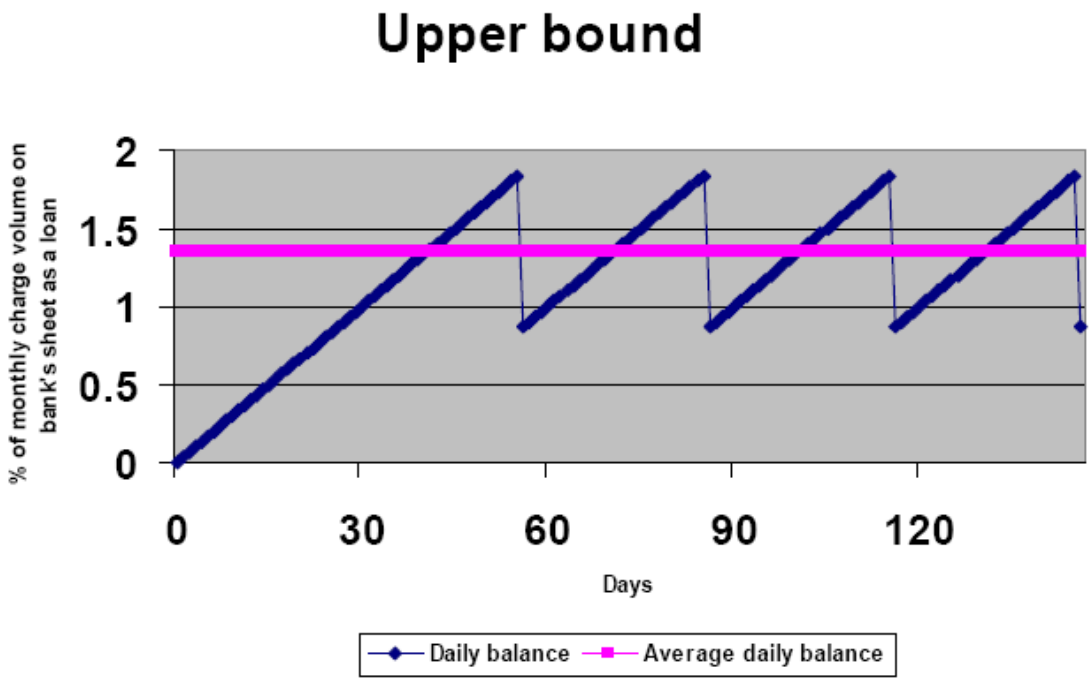
As a lower bound, suppose a pure convenience user always pays her entire balance online on the day her bill is issued. The average daily balance from these new charges will be half of her end-of-month balance.



As an upper bound, the average daily balance of a pure transactor who always pays his credit card bill on the day it is due (assuming a 25-day grace period) is about 1.35 times the size

[22] Most grace periods vary from 20 to 30 days. See www.federalreserve.gov/Pubs/shop/survey.htm for a list of grace periods for some cards.

of the consumer's end-of-month balance.



In fact these upper and lower bound estimates are probably biased downward a bit. I assume that every dollar of new charges will be paid off. In fact, outstandings are growing over time, so we know that, on average, some small proportion of new charges is not paid off.

So which bound (0.5 or 1.35) is closer to the truth? Unfortunately, I have not found any estimates of how much of the grace period the average consumer actually uses.[23] On the one hand, some issuers have shortened grace periods, which decreases the proportion of transaction balances to average daily balances. On the other hand, the advent of online bill payment has probably increased the proportion of accounts paying on the due date (and hence maximizing the grace period). I use 1.0 as a middle-of-the-road estimate to adjust G.19 outstandings using

[23] Grace period is used here for expositional simplicity. A more general statement (that includes borrowing-to-charge) would be that we lack estimates of the actual time elapsed between dollar-weighted transaction volume and when those charges are paid off.

average monthly new charges in Table 1, Column 3. As detailed in Section III, under Recent Charge Volume, this adjustment is basically the same whether it is constructed using SCF or Nilson data, since the new charges estimates from the two sources match up well.

Table 1. Where is the Missing Credit Card Debt? A Partial Reconciliation of Household and Industry Measures

Panel A: All Personal Credit Cards

Year	(1) SCF $ balances after last payments	+	(2) SSBF $ revolving on personal cards, business uses	+	(3) Nilson $ new charges	=	**(4) SCF $ adjusted for comparison to G19**	=?	**(5) G19 $ adjusted for comparison to SCF**	=	(6) G19 $ total	-	(7) G19 $ noncard outstandings from G.19 or SCF	**(8) SCF underreporting factor**	(9) SCF proport with any credit card	(10) SCF proport with general purpose card	(11) Nilson general purpose proport of outstandings	**(12) SCF underreporting factor, unadjusted (Col 6/Col 1)**
1989	70		n/a		30		**100**		**157**		202		45	**1.6**	0.70	0.57	0.74	**2.9**
1992	93		n/a		35		**128**		**247**		272		25	**1.9**	0.72	0.63	0.76	**2.9**
1995	130		1		66		**197**		**409**		427		18	**2.1**	0.74	0.67	0.82	**3.3**
1998	177		3		83		**263**		**551**		567		16	**2.1**	0.73	0.68	0.84	**3.2**
2001	185		5		109		**299**		**675**		707		32	**2.3**	0.76	0.73	0.86	**3.8**
2004	254		7		133		**394**		**758**		791		33	**1.9**	0.75	0.72	0.88	**3.1**

Panel B: General Purpose Personal Cards

Year	(1) SCF general purpose $ balances after last payments	+	(2) Nilson $ business-related outstandings	+	(3) Nilson $ new charges	=	**(4) SCF $ adjusted for comparison to Nilson**	=?	**(5) Nilson $ deflated from year-end for comp to SCF**	**(6) SCF underreporting factor**
2001	163		51		94		308		598	1.9

Panel C: G19 v. Nilson Outstandings at Year-End

Year	(1) G19 $ total	-	(2) G19 $ noncard outstandings	=	**(3) G19 $ adjusted for comp to Nilson**	=?	**(4) Nilson, $ adjusted for comp to G19**	=	(5) Nilson $ total	-	(6) Nilson $ commercial
2001	736		34		**702**		**676**		722		46

Notes on Panel A:
"Personal" credit cards exclude "commercial" accounts that are in the name of a business.

Dollar amounts are nominal billions.

SCF = Survey of Consumer Finances. All estimates constructed using population weights (variable x42001). Most SCFs are collected May-December. The SCF instructs respondents to not report any business or company accounts; this matches the G19 definition but not the Nilson definition (hence Panel B Column 2, and Panel C, Column 6), and implies that SCF respondents might not report activity on personal cards used for business purposes (hence Panel A, Column 2).

SSBF = Survey of Small Business Finances. Estimates apply to average use in 1998 and 2004; we do not include debt held by sole proprietorships on business cards since these are probably excluded by G19 as commercial accounts. 2001 SSBF estimate is interpolated, 1995 is extrapolated. The SSBF numbers probably underestimate the true adjustment needed for business-related outstandings on personal accounts since it represents a limited number of small businesses (e.g., 6.3 million in 2003); Nilson (various issues) notes that many large companies issue cards in employees' names for business use, Nilson #772 reports that over 20m small business owners use personal cards for business uses, and Nilson #776 estimates that total business-related outstandings (on personal and commercial accounts) were $51 billion at year-end 2001 (this is the figure reported in Panel B, Column 2). *Notes continued on next page....*

Notes on Table 1 Panel A, continued: Nilson = *The Nilson Report*. New charges exclude commercial accounts for 1995-2004 (see Table 2, Column 8). Commercial volume is not available separately for 1989 and 1992, but Nilson does report estimates of all business-related volume ($5b and $9b per month), and we subtract these off total Nilson charges. New charges are based on 1/12 of annual volume, including cash advances (see Table 2, Column 7) but not telephone cards since the SCF does not prompt for telephone cards (for details on excluding telephone card charges see the note to Table 2). An estimate of new charges must be added to the SCF revolving number to get comparability with industry outstandings because the SCF revolving questions ask only for account balances after the last payment was made. I use the Nilson measure here instead of the SCF measure because Nilson is more comprehensive and consequently requires fewer columns to present a definitionally comparable number (Table 2 shows that, after accounting for definitional differences, the SCF and Nilson deliver almost identical estimates of charges). Estimating how much of new charges should be included in outstandings requires assumptions about the frequency and timing of payments; see the Appendix for details. I present a middle-of-the-road estimate here.

G19 = *Federal Reserve Statistical Release: Consumer Credit*. Panel A estimates as of September 30th for each year; Panel C estimate as of year-end for 2001. All pulled from http://www.federalreserve.gov/releases/g19/hist/cc_hist_r.html on February 27, 2007.

Non-credit card revolving (Column 7) can not be broken out from the G19 prior to 2000 because the Call reporting forms lumped all lines of credit together. So for 1989-1998 I provide a comparable estimate from the SCF, subject to the caveat that these estimates may be influenced by outliers due to the low prevalence and occasional high intensity of non-card line of credit use.

General purpose cards include revolving bank cards (Visa and MasterCard), Discover, and American Express revolving accounts. They also include non-revolving charge cards from AMEX and Diners Club because Nilson does not break out charge account v. revolving account AMEX separately.

Nilson total outstandings (the denominator used in constructing Panel A Column 11) excludes $2b or less each year in telephone card outstandings because the SCF does not prompt for phone cards (and specifically prompts to exclude them in 2004).

Additional Notes on Panel B:

I report Panel B for 2001 and Nilson only (not other years, and not G19) because: a) Nilson has data on business-related outstandings only for 2001; b) disaggregating the G19 into general purpose vs. other types of cards can be done only imprecisely.

Nilson business-related outstandings includes both personal and commercial accounts; this is adjustment is required to render the SCF and Nilson comparable because the SCF plausibly excludes all business-related outstandings and the Nilson does not.

Nilson new charges include cash advances but exclude commercial accounts, as in Panel A.

I adjust Column 5 for slight seasonal differences in the SCF (collected May-Dec) and Nilson (year-end) outstandings by deflating the year-end Nilson amount by the ratio of September 30th to December 30th 2001 G19 outstandings.

Additional notes on Panel C:

I report Panel C for 2001 only because we can not construct the adjustment for Nilson commercial outstandings with any precision in other years.

Non-credit card G19 outstandings (Column 2) are drawn from the *year-end* G19; this explains the slight difference from Panel A Column 7.

I infer Nilson commercial outstandings by subtracting the SSBF estimate of revolving for business purposes on personal cards ($5b) from the $51b total business-related outstandings in Panel B Column 3. The adjustment of $46b for commercial outstandings is probably too high by an indeterminate amount because I have no precise way of adjusting further for business use of personal cards in larger businesses that is not covered by the SSBF, but is counted by G19 and Nilson.

Notes on Nilson by year:

1989 estimates. Issues sourced are from 1990: #s 477, 486 and 490. Commercial outstandings not available but bounded above at a small amount; e.g., AMEX was the largest corporate card issuer and its corporate outstandings can be bounded above at < $3B in 1990.

1992 estimates. Issues sourced are from 1993: #s 544, 550, and 554. Nilson total outstandings includes $2B in "other" category outstandings interpolated from 1989 ($3B) and 1995 ($1B). Total and general purpose outstandings include 15b of imputed outstandings on AMEX and Diners charge cards.

1995 estimates. Issue sourced is from 1996: #627.

1998 estimates. Issue sourced is from 1999: #705.

2001 estimates. Issues sourced are from 2002: #s 756, 772, 776, 777.

2004 estimates. Issue sourced is from 2005: #842

Table 2. Recent Credit Card Charges Measured by Household and Industry Sources

Panel A: All Personal Credit Cards

Year	(1) SCF charges last cycle	+	(2) SSBF business charges on consumer cards	*or*	(3) Nilson *all* business-related volume	=	(4) **SCF adjusted for comp to Nilson**	=?	(5) **Nilson, adjusted for comp to SCF**	=	(6) Nilson total charges	-	(7) Nilson cash advances	-	(8) Nilson commercial cards
1989	30		see Col (3)		5		**35**		**33**		35		2		see Col (3)
1992	31		see Col (3)		9		**40**		**41**		44		3		see Col (3)
1995	47		3				**50**		**57**		72		9		6
1998	54		4				**58**		**69**		95		14		12
2001	78		5				**83**		**91**		127		18		18
2004	103		6				**109**		**110**		157		23		24

Panel B: General Purpose Cards Only

Year	(1) SCF charges last cycle	+	(2) SSBF business charges on consumer cards	*or*	(3) Nilson *all* business-related volume	=	(4) **SCF adjusted for comp to Nilson**	=?	(5) **Nilson, adjusted for comp to SCF**	=	(6) Nilson total general purpose	-	(7) Nilson general purpose cash advances	-	(8) Nilson commercial cards
1989	22		see Col (3)		5		**27**		**23**		25		2		see Col (3)
1992	23		see Col (3)		9		**32**		**31**		34		3		see Col (3)
1995	37		3				**40**		**44**		59		9		6
1998	46		4				**50**		**56**		82		14		12
2001	69		5				**74**		**75**		112		18		18
2004	91		6				**97**		**93**		139		23		24

Charges in billions of nominal dollars per month.

Columns 2, 3, and 8 are motivated by the fact that SCF instructs respondents to exclude any business or company accounts (which could be either "personal" or "commercial" cards); Nilson total include business-related charges on both personal and commercial accounts. SSBF captures only business charges on *personal* accounts (Column 2), so in years where I lack an estimate from Nilson on *all* business-related volume on both personal and commercial accounts (Column 3), we need to use the SSBF *personal* card number in tandem with an adjustment for volume on commercial accounts (Column 8).

SCF: most surveys are administered from May-December. I assume SCF does not capture telephone cards, since the questions do not prompt for them (and 2004 specifically instructed respondents to exclude them), and they are not typically considered credit cards.

SSBF: 1998 SSBF asks about average charges per month during the 1998 year or fiscal use; the 2003 SSBF asks about current average monthly use (surveys were administered during 2004). 2001 (1995) is interpolated (extrapolated) from 1998 and 2004. I do not count SSBF charges on business card accounts that are held by sole proprietorships, since these are probably considered "commercial" accounts by the Nilson report and hence already accounted for in Column (8) or (3). *Notes to Table 2 continued on next page….*

Notes to Table 2, continued:

Nilson Reports, general: volumes are annual totals divided by 12. Total volume includes commercial cards and personal cards used for business purposes (issues 620, 632, 689, 699, 762, 776, 777, 842, 847). Prior to 2004 Nilson disaggregates telephone card volume, allowing me to exclude it. This is bounded above at a relatively tiny amount ($0.25B monthly) in 2004.

General Purpose cards include Visa, MasterCard, Discover, all American Express, and Diners + other minor non-revolving charge cards, as in Table 1. In Panel B I assume that all business-related activity and cash advances are on general purpose (as opposed to store or oil) cards; the assumption on cash advances is accurate but on business-related activity is a bit strong (principally because there is nontrivial volume on commercial gas card accounts).

Notes on Nilson Reports by year:

1989 estimates. Issues sourced are from 1990: total volume from #477; cash advances from Visa and MasterCard only (#475); but Nilson's mid-year projection for total 1990 volume is only $2.5B per month (#479), so we are missing < $1B per month in 1989. #482 includes a projection of all business-related volume for 1990: $70B, or $6B monthly. I arbitrarily adjust this to $5B monthly for the 1989 estimate- this subsumes the separate commercial account and business use of personal cards adjustments for 1995-2004.

1992 estimates. Issues sourced are from 1993. Total and cash advance volumes from various issues: only general purpose (#544-- Visa, MasterCard, Discover, AMEX, Diners) and oil company cards (#554) reported comprehensively as in other years. I impute the other components as follows: the "retailer" card portion imputed from data on private label market shares in #560. To do this I assume that the market shares are equal for outstandings (given in #560) and charges (not given in #560). I assume that monthly "other" cards charges are the same as in 1995 ($1B). #547 includes an estimate of all business-related volume-- this subsumes the separate commercial account and business use of personal cards adjustments for 1995-2004.

1995 estimates. Issues sourced are from 1996: total and cash advance volumes from #s 627 and 632; commercial from #620.

1998 estimates. Issues sourced are from 1999: total and cash advance volumes from #705; commercial is interpolated from 1995 and 2004 (partial data in #699).

2001 estimates. Issues sourced are from 2002: total and cash advance volumes from #772; commercial is interpolated from 1995 and 2004 (partial data in #s 762, 766, and 767)

2004 estimates. Issues sourced are from 2005: total and cash advance volumes from #842, commercial volume from #838 and #839.

Table 3. Credit Card Account Counts in Household and Industry Data

Year	(1) SCF households at top-code	(2) SCF general purpose	(3) Nilson general purpose active	(4) SCF underreporting factor vs active	(5) Nilson general purpose total	(6) SCF underreporting factor vs total	(7) SCF store	(8) Nilson store active	(9) Nilson store total	(10) SCF oil	(11) Nilson oil active	(12) Nilson oil total	(13) SCF total 3 cols	(14) Nilson active total	(15) Nilson total 3 cols
1989	0.003%	102	114	1.1	161	1.6	197	147	296	51	36	70	350	297	527
1992	0	123	137	1.1	203	1.7	168	n/a	n/a	50	33	68	341	n/a	n/a
1995	3.5%	172	208	1.2	334	1.9	172	167	432	45	27	64	389	402	830
1998	2.9%	174	225	1.3	396	2.3	150	161	486	34	25	56	358	411	938
2001	2.3%	193	271	1.4	466	2.4	128	156	430	28	23	47	349	450	943
2004	2.6%	208	278	1.3	508	2.4	139	131	406	23	18	32	370	427	946

Columns 2-15 are accounts in millions.

SCF: most surveys are conducted May-December. Top-coding rules: 1989-- censored at 20 for each type of account. 1995-2004-- censored at 10 accounts each for general purpose and store cards, and at 5 each for other types of cards. Almost all top-coding occurs on general purpose and store cards.

"General purpose" includes Visa, MasterCard, Discover, and AMEX revolving credit cards. 1995-2004 also include non-revolving charge cards from AMEX and Diners because AMEX revolving is not reported separately in Nilson (conversely, I could not find total number of non-revolving active charge accounts for 1989 or 1992). "Store" cards are those that can be used only at a specific retailer. "Oil" cards that can only be used at gas stations. The three types of accounts shown (general purpose + store + oil) comprise 99% of all credit card accounts, excluding telephone cards.

Nilson: counts are year-end. Nilson defines "active" as billed recently.

Likely sources of discrepancy between SCF and Nilson include: SCF respondents only reporting active accounts, SCF respondents excluding business-related accounts that are included in Nilson, and SCF top-coding. We discuss these explanations and provide additional data and results in Section III-C of the text.

Nilson notes by year:
1989 estimates. Issues sourced are from 1990 (#s 475, 476, 477, 490), and 1993 (#542). AMEX revolving accounts (2 million) imputed from the number of cards (3.4 million), assuming the same account/card ratio as Visa and MasterCard. I do the same exercise to impute *activ*e AMEX revolving accounts; the result is again 2 million after rounding.
1992 estimates. Issues sourced are from 1993: #s 542, 545, 549, 550, 554. Number of AMEX revolving cards in 1992 was 3.5 million; I do the same account imputations as for 1989. I could not find total store accounts for 1992 in the 1993 Nilson Reports.
1995 estimates. Issues sourced are from 1996: #s612, 617, 618, 620, 625, 626, 627. Number of active accounts not available for AMEX and Diners, so I impute using the active proportion from 1998 (total AMEX + Diners accounts were 23m in both years).
1998 estimates. Issues sourced are from 1999: #s 684, 689, 690, 693, 703, 705.
2001 estimates. Issues sourced are from 2002: #s 756, 760, 764, 767, 772. Diners' active accounts not reported separately (there were only 2m accounts total), so I impute assuming the same active proportion as for AMEX.
2004 estimates. Issues sourced are from 2005: #s 827, 828, 837, 838, 841, 842.

Appendix Table 1. Characteristics of Marginal General Purpose Card Holding Households

Year	income	education	age	nonwhite	female	unmarried	homeowner	job tenure
1989	$46,661	13.1	51.0	0.14	0.26	0.39	0.71	7.1
1992	$40,528	13.5	50.3	0.16	0.26	0.42	0.68	7.4
1995	$39,730	13.1	50.6	0.18	0.29	0.47	0.65	6.7
1998	$41,271	13.3	50.4	0.18	0.26	0.47	0.65	7.3
2001	$40,604	13.3	50.4	0.19	0.30	0.49	0.66	7.8
2004	$41,000	13.5	50.9	0.23	0.32	0.50	0.69	6.1

Sample is households with 1 general purpose card.

Weighted means, except for household income, which is weighted median in 2003 dollars.

Education is years completed.

Education , age, race, gender, and marital status are those of the survey respondents.

Job tenure is years with current employer.