Social and Psychological Determinants of Consumption: Evidence for the Lipstick Effect During the Great Recession

Abstract: Using the Great Recession as a case study, we evaluate the evidence for the "lipstick effect" by analyzing expenditures on cosmetics products using data from the Bureau of Labor Statistics' Consumer Expenditures Survey. We find a significant increase in average cosmetics expenditures among younger women (age 18-40) during the Great Recession. The increase occurred regardless of marital or employment status, providing evidence against popular explanations for the lipstick effect in the academic literature: to wit, that women purchase more lipstick either to attract a mate during uncertain economic times, or to increase the probability of staying or becoming employed during the economic downturn. Rather, we find evidence to support the claim that the lipstick effect is caused by a substitution away from spending on women's clothes.

Key words: consumer economics, lipstick effect, Great Recession

Introduction

This paper examines the empirical evidence for the lipstick effect. The lipstick effect is a phenomenon whereby expenditures on cosmetics increase during economic downturns. The lipstick effect has been used to explain the success of the cosmetics industry during the Great Depression (Koehn 2001), as well as the performance of companies during more recent economic downturns (Economist, 2009). Traditional economic theory predicts that, due to the income effect, expenditures on cosmetics should decline during a recession. Three alternative mechanisms have been proposed to explain why expenditures on cosmetics might counterintuitively increase. The first is a psychological motivation: as income declines during a recession, women purchase lipstick instead of clothing or jewelry, in order to "treat" themselves in a more frugal way. The second is based on a hypothesis from anthropology and social psychology: in uncertain economic times, women purchase lipstick and other cosmetics to increase their attractiveness in order to find a mate. The third mechanism is employment-based: when the unemployment rate is high, women purchase more beauty-enhancing products and become more social in order to increase the probability of either staying or becoming employed.

Few academic studies of the lipstick effect exist, but they all find evidence in support of it. The only major disagreement is over the mechanism driving the phenomenon. We are not aware of any study that has looked at a purely psychological motivation (i.e., forgoing spending on other luxuries like jewelry or clothes and purchasing more makeup instead), although this is the most commonly cited reason in popular media (Schaefer 2008; Elliott 2008; Allison and Martinez 2010). On purchasing lipstick to attract a mate during uncertain times as a social psychological motivation, Hill et al. (2012) provide extensive evidence. On the employment-based theory, Netchaeva and Rees (2016) argue that while finding or keeping a job is indeed a stronger motivator than finding a mate (i.e., the social psychological mechanism), both explain the increase in cosmetics purchases during a recession.

Both Hill et al. (2012) and Netchaeva and Rees (2016) mostly rely on experimental evidence to support their claims. We choose the Great Recession as our case study and assess the evidence for the lipstick effect at the household level using microdata from the Bureau of Labor Statistics' Consumer Expenditures Survey (CEX).[1] The Diary survey component of the CEX (as opposed to the Interview survey component) allows us to calculate annual estimates of cosmetics expenditures, and expenditure shares, by age, sex, marital status, and other factors. The fact that the data are annual allows us to estimate the effects of the Great Recession on cosmetics expenditures among different demographic groups.

Our contribution to the literature is therefore to analyze household-level expenditure data and assess the different explanations provided for lipstick effect. Looking ahead to the main findings, we show that during the Great Recession average cosmetics expenditures among women age 18-40 increased. However, the increase was not driven by life cycle-based mechanisms: average expenditures on cosmetics are higher among unmarried women age 18-40 in general, and there

[1] The Great Recession has been used to study changing consumption patterns in general in Aguiar and Bils (2015) and specifically entertainment spending in Kim and Gao (2017).

was no significant change in behavior between unmarried and married women during the Great Recession – both groups increased their cosmetics expenditures. Furthermore, the frequency of cosmetics expenditures declined slightly during the Great Recession, further disproving the idea that women's response was to increase their frequency of use in order to attract a mate.

Employment-based hypotheses for the lipstick effect also do not hold weight. While employed women do spend more on cosmetics, they did not increase their spending or frequency during the Great Recession. Including a control for employment status does not change the estimated effect of the Great Recession on average cosmetics expenditure.

We turn to the final explanation – that the lipstick effect is driven by a desire to "treat" oneself more frugally by spending less on clothes or jewelry and purchasing new cosmetics products instead. We provide evidence showing that during the Great Recession, younger women reduced expenditure shares in several categories, even as they increased their expenditure share on cosmetics. Even though the price of cosmetics relative to women's clothes increased during the Great Recession, women substituted out of clothes and into cosmetics – a plausible claim given that the typical cosmetics purchase is much less than the typical clothing purchase. This is strong evidence suggesting that the substitution was driven by a psychological desire to "treat" oneself in a more frugal way during an economic downturn.

The paper is organized as follows. We first discuss the data used to analyze the lipstick effect. We then turn to a discussion of the major explanations offered for it by previous research. Next we develop a framework to understand the mechanisms underlying the lipstick effect as well as our empirical approach to testing it in the data. Finally, we discuss our results and their significance.

Data

The CEX data are composed of two parts: an Interview survey and a Diary survey. The two surveys are very different. The Interview survey is conducted on each household once a quarter for 4 consecutive quarters. An interviewer asks the household to document all expenditures made over the previous 3 months. Using this method, major purchases like automobiles or furniture, as well as recurring expenses like rent or mortgage payments, can be captured easily. Smaller purchases, such as the contents of a particular week's grocery bill, are less easily captured.

In the Diary survey a completely different sample of households records all expenditures made each day across a two-week time period. Some major expenditures such as rent or mortgage payments might not be captured in this survey if they are not made during the two-week period during which the diaries are being recorded. Thus, many of the Diary survey's weaknesses are the Interview survey's strengths, and vice versa. For example, relatively accurate estimates of, say, chicken, beef, or vegetable expenditures can be obtained using the Diary survey, where this is less likely to happen in the Interview survey because people generally do not keep extensive records of their grocery bill. In addition to grocery items, the Diary survey is also used to estimate spending on alcoholic beverages, limited and full-service restaurants, and personal care products that are bought on a frequent basis.

In general, the Interview survey is relied on more than the Diary survey for expenditure estimates in academic research on household level consumption decisions, but both are used by the BLS in its annual published reports on the CEX. A document provided by the BLS indicates which expenditure categories are drawn from which survey to produce annual expenditure estimates, showing that the Diary survey is primarily used for the estimates of expenditures on "food at home" (i.e., groceries), "food away from home" (i.e., restaurant expenditures), alcoholic beverages, housekeeping products, most clothing and footwear (except for suits, sport coats, and uniforms), and "personal care products and services", of which cosmetics are a part.[2]

Since the Diary survey is the only survey that captures purchases of cosmetics, we use this data for most of our analysis. We use the expenditure category code for cosmetics purchases provided in the CEX microdata's expenditure files. Unfortunately, it is not possible to determine how much money is spent specifically on lipstick – all cosmetics are grouped together by the BLS survey instrument under the same code. "Cosmetics" could refer to perfume or bath products, as well as makeup, but we would argue that the "lipstick effect" could very well apply to most of such products anyway (Chiaroni 2016).

In addition to detailed expenditure information, Diary survey microdata files provided by the BLS include demographic information on the survey respondent, including age, sex, race, marital status, educational attainment, employment status, and occupation, as well as limited geographic information. The survey respondent is the one who owns or rents the house in which the consumption unit lives and is therefore assumed to make the majority of the financial and consumption decisions regarding the household. Based on the primary demographic information, the sample weights provided by the BLS in the microdata files can be used to generate statistics that are representative of the entire U.S. population of households.

We use data from the years 2005 to 2014, covering the Great Recession (defined by the National Bureau of Economic Research as occurring between December 2007 and June 2009) as well as 3 years before and 5 years after. Table 1 reports sample sizes by year, sex of respondent, and marital status for all households reporting positive expenditures in the Diary survey for these years.

One weakness of the data, seen in the table, is the decline in the total amount of Diary survey respondents starting in 2010. This is a well-known issue that the BLS is working to address by considering a reduction of the diary length from 2 to 1 weeks and implementing an online diary which would allow multiple members of the household to keep track of their expenditures. While the decline in response rates is concerning, in a summary analysis of user concerns regarding the CEX data conducted about 10 years ago, nonresponse bias was not identified as a major issue. Instead, issues of respondent fatigue, recall bias, and imperfect information about expenditures by all members of the household were considered more serious, prompting the abovementioned improvements to the Diary survey (Gonzalez et al. 2009).

[Table 1]

[2] The title of this document is "Survey Source of Data for Consumer Expenditure Survey Integrated Tables" and can be found here (accessed January 18, 2020): https://www.bls.gov/cex/ce_source_integrate.xlsx.

In summary, while the CEX data are admittedly imperfect, they come from the most comprehensive federally administered study of consumer expenditures available, with a rich set of demographic controls that can account for many factors influencing consumption decisions. In particular, the Diary survey provides detailed information on purchases of minor goods and services like groceries, restaurants, and personal care products that are difficult to find information on elsewhere.

Explanations for the Lipstick Effect

Standard economic theory classifies goods and services according to their income elasticity of demand. Most goods are considered normal goods, which means that demand for them varies positively with income, holding prices constant. If demand for a good or service varies negatively with income, it is considered "inferior". For normal goods, a decline in income (such as during a recession) with no change in prices causes a decline in expenditures.

Can the lipstick effect be explained by economic theory? Lipstick is clearly not an inferior good because households spend more on cosmetics as their income rises. However, if prices change along with the fall in income, demand for a normal good might not decrease. For example, if the relative price of a normal good falls at the same time as the decline in income, demand for it could increase due to the substitution effect dominating the income effect. Thus, the lipstick effect can only be explained by standard economic theory if the relative price of lipstick declines by a greater amount than the decline in income.

The BLS publishes price indices for a wide variety of consumer goods and services. Cosmetics prices increased 2.9% between 2007 and 2010, while overall prices increased 5.2% during that same time period. Thus, the price of cosmetics relative to the market basket of goods and services did in fact decline. However, income declined by much more: according to the U.S. Census Bureau, between 2007 and 2010, real median household income declined by about 7.2% (from $59,500 to $55,500 in 2017 dollars). As a result of these observations, studies of the lipstick effect have relied on other social sciences, most notably psychology and anthropology, to uncover the mechanisms that might explain the lipstick effect. We now turn to a discussion of these explanations.

Hill et al. (2012) argue for what we will term the **life cycle hypothesis** which stems from anthropology and social psychology: an economic downturn drives concerns of finding a mate when the supply of mates with adequate resources to support the family is relatively low. According to the authors, "individuals living in harsh environments marked by ecological resource scarcity and financial impoverishment tend to allocate effort toward more immediate reproduction than those living in more resource-abundant, financially secure environments" (pg. 276). They provide evidence for this view in a series of 5 studies (4 of which are based on experimental evidence) which test the relationship between economic insecurity and survey respondents' desire for beauty-enhancing products. In the one non-experimental evidence-based study, they analyze nationally representative data on cosmetics expenditure shares and find that they are positively correlated with the unemployment rate.

For women participating in the labor force, concerns about keeping or finding a new job could drive an increase in cosmetics expenditures, leading to an **employment-based hypothesis**. Netchaeva and Rees (2016) use experimental evidence to confirm this prediction. They find that anxiety about the economy produces a desire to purchase cosmetic items such as lipstick, mascara, perfume, and facial cream. They argue that, while the desire for these products is ultimately driven both by a desire to attract a mate and by a desire to find a new job (or stay employed), the latter motivation dominates the former.

Aside from these academic studies, several popular media articles drawing on anecdotal evidence have provided a third, purely **psychological hypothesis**: the need, even in a time of limited resources, to treat oneself (Schaefer 2008; Elliott 2008; Allison and Martinez 2010). Stories of women who, when economic times are bad, forgo an expensive (say, $75) pair of shoes but purchase a new (say, $25) makeup kit, are common in these articles. Mark et al. (2016) find an increase in "cross-category indulgence" during the Recession, supporting this idea: "[t]o purchase a premium brand in a different, more affordable category fulfills a consumer's desire for hedonic consumption despite financial constraints" (pg. 116). Essentially, consumers still desire premium brands even when their income goes down, so they buy the same brand name but in a cheaper expenditure category – the authors suggest that instead of buying the premium Louis Vuitton bag, they purchase a cheaper Louis Vuitton wallet instead. The same logic could be applied to the demand for cosmetics.

While not directly referring to the lipstick effect, Hamilton et al. (2018) provide a framework for analyzing the relationship between economic downturns and consumption patterns, providing support for the mechanisms outlined above. Their theory begins by noting that financial constraints lead to *resource scarcity*, *choice restriction*, *social comparison*, and *environmental uncertainty*. In response to these 4 factors, people react, cope, and adapt. For example, faced with resource scarcity, consumers might react by paying more attention to the cost of certain goods and services, like luxury items or food away from home, and adapt accordingly by scaling down expenditures in these categories. At the same time, due to competition over scarce resources (such as jobs or promotions), people focus more on how their situation relates to their peers (i.e., part of the "social comparison" factor) and might adapt by improving their appearance and being more social, leading to an increase in cosmetics expenditures.

In summary, we first established that the lipstick effect is often a phenomenon that is at odds with standard economic theory, because most goods and services are "normal", meaning spending on them declines during recessions. Three alternative explanations have been provided for the lipstick effect: a life-cycle hypothesis based on anthropology and social psychology; an employment-based hypothesis about the need to find or keep a job during recessions; and a purely psychological hypothesis which acknowledges the need for consumers to "treat" themselves even during periods where they have lower income. Our empirical approach, discussed in the next section, will test these hypotheses using microdata from the CEX.

Framework and Empirical Approach

The hypotheses that we will test in this paper are informed by the previous discussion. We will examine whether households increased cosmetics expenditures during the Great Recession. We will test the life cycle hypothesis by estimating whether the lipstick effect is driven by unmarried women purchasing more cosmetics than married women during the Great Recession. We will test the employment-based hypothesis by examining whether employment status was a significant factor in driving cosmetics use during the Great Recession – either negatively or positively. Finally, we will test the psychological hypothesis by examining the extent to which consumers substituted out of other expenditure categories in order to purchase more cosmetics.

We employ a two-stage empirical approach. We are interested in the reasons for making a cosmetics purchase as well as the determinants of the amount of cosmetics expenditures. This approach is taken by Byrne et al. (1996) in their analysis of food away from home expenditures and more recently by Zhao et al. (2016) in their analysis of floral expenditures. Both authors first estimate the determinants of the probability of making a purchase in some expenditure category, and second, estimate the determinants of the amount of money spent on the purchase.

The specific reason for using the two-stage approach in our paper is that the decision to purchase cosmetics is qualitatively different from the decision on how much to spend. Wagstaff (2018) finds that an increased frequency of use of cosmetics (i.e., an increase in the probability of purchase) signals the desire to raise a woman's "mate value" - this refers to "sexual strategy" or "social comparison" reasons to use lipstick. On the other hand, an increased quantity of use for a given woman, i.e., an increase in expenditures, indicates self-promotional tactics or narcissism. Wagstaff finds, for example, that single women are 2.5 times more likely than married women to purchase lipstick and concludes that sexual strategy or social comparison reasons are dominant in the decision to purchase cosmetics in the first place - i.e., independently of the amount of expenditure on cosmetics. In Wagstaff's framework, the main factor determining the amount of expenditure is the degree of the consumer's narcissism.

Drawing on the results from Wagstaff (2018), and reflecting on the Hill et al. (2012) study, there would be stronger evidence to support the life cycle theory of the lipstick effect if the Great Recession raised the probability of making a cosmetics purchase. Intuitively, in this case we argue that some people who did not feel the need to purchase lipstick before the Great Recession felt the need to do so during it – presumably because of a need to find a mate. A subsequent analysis of the determinants of the *amount* of cosmetics expenditures could reveal further insights into whether the Great Recession did indeed lead to an increase in sales of lipstick or cosmetics more generally. Thus, important insight into the mechanisms driving the lipstick effect can be found by looking both at average cosmetics expenditures as well as the frequency of making a cosmetics purchase.[3]

[3] We also note that Netchaeva and Rees (2016) make an additional prediction: an increase in frequency of cosmetics purchases is determined by the need to demonstrate both sexual competence and employability, which adds an economic element (the need to find a job) to Wagstaff's explanatory framework.

We model the probability of making a cosmetics purchase as a (0,1) decision via a logistic regression model. In our sample of over 100,000 households across the 2005-2014 period, about 78% do not report making any cosmetics expenditure in the two weeks' span in which they completed their diary. We model the probability of purchasing cosmetics as a function of individual and household characteristics. The model is specified as follows, with $Y_{it} = 1$ indicating that the household reported making a cosmetics purchase and $Y_{it} = 0$ indicating that it did not:

$$\text{Prob}\,(Y_{ht}=1) = \beta_0 + \delta_1*\text{Married}_{ht} + \delta_2*\text{Age\_18-40}_{ht} + \delta_3*\text{Female}_{ht} + \delta_4*\text{Employed}_{ht} + \beta_1*\text{Race}_{ht} + \beta_2*\text{Education}_{ht} + \varepsilon_{ht} \quad \text{[Equation 1]}$$

Here, the probability of household *h* making a cosmetics purchase in year *t* is specified as a function of whether the respondent is in various categories: age 18-40, sex, race and ethnicity, marital status, employment status, and educational attainment. Categorical variables are used to more easily interpret the estimated coefficients, which are the change in likelihood (or odds) of purchasing cosmetics associated with whether the consumer is in particular categories relative to a reference group (such as being married vs. unmarried, being employed vs. unemployed, or being in a particular age group vs. not being in that age group). A full list of the categories and their summary statistics, based on the sample weights provided by the BLS, are reported in Table 2.[4]

[Table 2]

Equation 1 is then augmented with a dummy variable indicating the years of the Great Recession, which we define as 2008-2010. Although the National Bureau of Economic Research defines the Great Recession as occurring between December 2007 and June 2009, the national unemployment rate continued to increase through 2010, consumption decreased through 2010 (De Nardi et al. 2011), and median income continued to fall through 2010, motivating us to include it as the end year.[5] We estimate this regression model using the years 2005-2010 to conduct a "before-during" study of how cosmetics expenditures changed during the Great Recession. We then interact the "recession" dummy with dummies for marital status and an "age 18-40" indicator to test whether younger married women responded differently than younger unmarried women.

$$\text{Prob}\,(Y_{ht}=1) = \beta_0 + \gamma_1*\text{Recession}_{ht} + \gamma_2*\text{Recession x Age18-40 x Married}_{ht} + \gamma_3*\text{Recession x Age18-40 x Unmarried}_{ht} + \delta_1*\text{Married}_{ht} + \delta_2*\text{Age\_18-40}_{ht} + \delta_3*\text{Female}_{ht} + \delta_4*\text{Employed}_{ht} + \beta_1*\text{Race}_{ht} + \beta_2*\text{Education}_{ht} + \varepsilon_{ht} \quad \text{[Equation 2]}$$

In the second part of our empirical approach, we analyze the factors associated with the amount of spending on cosmetics and cosmetics expenditure shares. Thus, we estimate Engel curves for

[4] We add a few additional controls to our regressions: family size, income rank (by quartile), urban status of household's location, employment type, and tenure status of household (owned versus rented), but because including these variables reduces the sample size by about 30%, we do not include them in all our specifications.

[5] Many economists have used a variety of metrics to argue that the recovery from the Great Recession was slow. In addition to the abovementioned statistics, the unemployment rate peaked in 2010 and real median household income continued to fall through 2012, according to the U.S. Census Bureau.

cosmetics expenditures on the subsample of households that made a positive purchase of cosmetics between 2005 and 2014 (27,133 households out of 126,473[6]):

$$Y_{ht} = \beta_0 + \lambda_1 * \log\_expend_{ht} + \beta_1 * Age_{ht} + \delta_1 * Married_{ht} + \delta_2 * Female_{ht} + \delta_3 * Employed_{ht} + \beta_2 * Race_{ht} + \beta_3 * Education_{ht} + \beta_4 * Fam\_size_{ht} + \varepsilon_{ht} \quad \text{[Equation 3]}$$

The dependent variable, Y_{ht}, is cosmetics expenditures, of which the natural log is taken – consistent with previous empirical studies of Engel curves (Lewbel 2006; Heffetz 2011; Aguiar and Bils 2015). Also consistent with past research, our Engel curves are estimated as expenditure elasticities rather than income elasticities.

We then add "recession" indicator dummies to Equation 3 (as we did in Equation 2), which in turn (again, as in Equation 2) are interacted with age and marital status indicators to further test for disproportionate effects of the recession on consumption patterns. Equation 4 is estimated on the 2005-2010 subsample to again simulate a "before-during" study of the effects of the Great Recession on the change in cosmetics expenditures.

$$Y_{ht} = \beta_0 + \gamma_1 * Recession_{ht} + \gamma_2 * Recession\_Age18\text{-}40\_Married_{ht} + \gamma 3 * Recession\_Age18\text{-}40\_Unmarried_{ht} + \lambda_1 * \log\_expend_{ht} + \beta_1 * Age_{ht} + \delta_1 * Married_{ht} + \delta_2 * Female_{ht} + \delta_3 * Employed_{ht} + \beta_2 * Race_{ht} + \beta_3 * Education_{ht} + \beta_4 * Fam\_size_{ht} + \varepsilon_{ht} \quad \text{[Equation 4]}$$

In our final empirical test, we calculate expenditure shares of different expenditure categories to determine which goods or services households might have reduced their spending on in order to increase their purchases of cosmetics. Unfortunately, we are limited by the fact that the Diary survey is not used by the BLS as the representative sample for most expenditure categories. Recall that the Diary survey best captures small, frequently purchased items. Thankfully, the Diary survey is used to estimate women's clothing expenditures – which are an ideal candidate for substitution into cosmetics. It is also used for watches. It is not used for jewelry, but we include these statistics as well. Thus, we estimate the elasticity of substitution between cosmetics purchases and expenditures on "food away from home" (i.e., restaurant purchases), alcoholic beverages, food at home, jewelry, watches, and women's clothing.

Descriptive Statistics

Before discussing our regression results, we use the CEX data to establish some basic facts and trends in the consumption statistics and cosmetics expenditures specifically. Previous studies have found that consumption expenditures declined across most categories during the Great Recession, but some declined more than others. Di Nardi, French, and Benson (2011) found that the Great Recession was marked by a "severe" decline in consumption which took 3 years to recover. Petev, Pistaferri, and Eksten (2011) found that consumption on durables fell more than non-durables. Specifically, spending on vehicles and furniture both declined more than average.

Table 3 shows statistics of personal care products, food away from home, and food at home expenditures, which are categories for which the Diary survey is used to establish nationally

[6] While 28,409 households reported positive cosmetics expenditures, we eliminated from the sample 1,276 consumers which report cosmetics expenditure shares above 10%.

representative estimates.[7] According to the table, total cosmetics expenditures increased from 2005 to 2007, declined from 2008 to 2010, and increased thereafter. Comparing the pre-Recession (2005-2007) average to the Recession (2008-2010) average, average cosmetics expenditures declined 0.2%, compared to a 1.0% decline in food away from home and an 11.2% increase in food at home expenditures. Thus, the data show a very small decline in total cosmetics expenditures during the Great Recession – a much smaller decline than many other expenditure categories.

[Table 3]

Table 4 presents cosmetics expenditure frequencies by year – i.e., the percentage of households each year that reported making a cosmetics purchase in the 2 weeks in which they completed their diary. While frequencies declined slightly through the entire 2005-2014 period, there was no evidence of a major shift in behavior during the Great Recession. Taken together, these statistics suggest that while overall cosmetics expenditures did not significantly increase during the Great Recession, they also did not decrease to the same extent as other expenditure categories.

[Table 4]

Table 5 uses the CEX microdata's income ranking (i.e., percentile) to calculate average cosmetics expenditures and expenditure shares for different income quintiles, showing that cosmetics are indeed a normal good.[8] Expenditure and expenditure shares increase in higher income quintiles.

[Table 5]

Table 6 presents average expenditure statistics. Average cosmetics expenditures declined from a peak of $165.48 in 2007 to a trough of $148.06 in 2010. Women's clothes also declined over the same time period (from $478.48 to $449.81). Consistent with the previous literature, we find that average food at home expenditures increased during the Great Recession and food away from home (i.e., spending at restaurants) decreased. These statistics reflect a shift in time use toward home production (Nevo and Wong 2019; Aguiar, Hurst, and Karabarbounis 2013).

[Table 6]

As a brief aside, note that in Table 6 average total household expenditures increased only slightly (about 4%) between 2005 and 2014. Translated to real terms, the increase would be negative. But consumption obviously did not decline during this time period. These statistics point to a well-known flaw with both the Interview and Diary surveys, both of which have seen a deviation between their expenditure estimates and estimates based on Personal Consumption Expenditures

[7] Following the BLS' suggested procedure, we took the total annualized dollar value of cosmetics expenditures reported by each household, multiplied that number by the household's weight, and then summed that number across all households in a given quarter (January-March, April-June, July-September, October-December). This gave us an annual estimate of total expenditures for that particular quarter – i.e., four separate estimates of annual expenditures. Finally, we averaged the four estimates, weighted by the total household population estimate for each quarter, to obtain our annual estimate.

[8] Statistics from this table exclude the previously-mentioned outliers – households reporting a cosmetics expenditure share greater than 10% of their budget – 1,276 observations from our sample. This excludes cases where households are reported making cosmetics purchases and nothing else, as well as other extreme cases of expenditure shares.

data, part of the National Income and Product Accounts produced by the Bureau of Economic Analysis (Bee, Meyer, and Sullivan 2012; Aguiar and Bils 2015). The errors are particularly glaring in the Diary survey because of the declining sample size and the fact that some major expenditures, like housing or automobiles, are not necessarily captured by the two-week survey format. Another issue with both Diary and Interview data is the underreporting of expenditures among higher-income respondents. This leads to underestimation of consumption inequality (Aguiar and Bils 2015).

At any rate, while the statistics in Table 6 are informative of broader trends in average expenditures, they mask substantial variation in spending behavior among different demographic groups. Some households reduced cosmetics expenditures during the Great Recession, but others increased them. According to Table 7, younger women – age 18-40 – increased their cosmetics expenditures during the Great Recession. The increase occurred regardless of marital status and was of greater magnitude for married women (from the 2005-2007 period to the 2008-2010 period, a 2.8% increase for unmarried vs. 9.8% for married). Cosmetics expenditure shares also increased for women in this age group.

[Table 7]

In summary, the lipstick effect hypothesis is still valid, but it applies mainly to younger women. Cosmetics expenditures did decline slightly during the Great Recession, as was the case for many other expenditure categories. There was also no major change in the frequency of purchase across the entire sample, and expenditure shares vary positively with income. These statistics are consistent with the broader fact that cosmetics expenditures are a normal good. But among a specific subset of younger women, the lipstick effect appears to be valid. To evaluate whether these patterns hold after accounting for other determinants of cosmetics expenditures, we turn to the regression analysis.

Regression Analysis

We now discuss our regression results. Refer to Table 8 for the results of estimating our logit model. In Column 2, we find that there is a significant positive difference in the odds of purchasing cosmetics between unmarried versus married women age 18-40. After controlling for income, education, race/ethnicity, and other factors, unmarried women age 18-40 are *more* likely to purchase cosmetics and married women age 18-40 are *less* likely to purchase cosmetics (the odds ratio is 1.189 for unmarried women and 0.93 for married women, where an odds ratio greater than one indicates increased odds[9]).

[Table 8]

This result is consistent with Wagstaff's (2018) finding that single women are much more likely to purchase cosmetics than married women. It also illustrates that the differences in cosmetics expenditure frequency between unmarried and married women observed in Table 7 – opposite of what we find here – were likely being driven by differences in income between the two groups, with married women earning significantly higher income than unmarried women in our sample,

[9] The coefficient for the "married, 18-40" dummy is only significant at the 90% level (p-value=0.081).

thereby leading to the erroneous conclusion that being married predicts a higher frequency of cosmetics purchase. Among married and unmarried women with similar incomes, unmarried women are more likely to purchase cosmetics.

In Column 2 of Table 8 we also find that both African American and Hispanic/Latino consumers have higher odds of purchasing cosmetics relative to whites (odds ratios of 1.15 and 1.4 respectively), while Asian consumers have significantly lower odds of purchasing cosmetics relative to whites (odds ratio is 0.88). These estimates are statistically significant. While not reported in this table, there is also a statistically significant positive association between purchasing cosmetics and higher educational attainment and income.

Turning to Column 3 of Table 8, we find that the recession years are associated with lower odds of purchasing cosmetics (with an odds ratio of 0.91 meaning about a 9% lower chance than in non-recession years). Furthermore, there is a significant increase in the odds of purchasing cosmetics only among married women during the Great Recession – although the coefficient on which this odds ratio is based (1.14) has a p-value of 0.062.[10]

Taken together, the regression results in Table 8 suggest that the life cycle hypothesis cannot explain the increase in cosmetics expenditures among women age 18-40 during the Great Recession. The life cycle hypothesis predicts that women increase the frequency of purchasing cosmetics during a recession in order to increase the chances of attracting a mate. However, we find that the cosmetic expenditure frequency of married rather than unmarried women increased during the Great Recession – and even this is only significant at the 90% confidence level. And while it is true that unmarried women were more likely than married women to purchase cosmetics, this was true throughout the entire time frame of the sample, with no significant change in behavior during the Great Recession.

One final remark concerns the "employed, recession" coefficient in Table 8 – referring to an interaction of the "recession" dummy variable with the "employed" dummy variable to test whether the frequency of cosmetics purchase changed among employed women during the Great Recession. It is positive and not significant (odds ratio equals 1.01), implying that there was no significant increase in the frequency of cosmetics purchases among employed women during the Great Recession. Further, the inclusion of this variable does not dramatically change the coefficient in front of the "recession" dummy variable, suggesting that employment status cannot explain the effect of the recession on the probability of cosmetics purchase observed here. Thus, there is no evidence in Table 8 to support the employment-based hypothesis that women were purchasing more lipstick during the recession in order to increase the probability of finding or keeping a job.

Next, Table 9 shows results from the regression analysis of cosmetics expenditures, based on the subsample of households reporting any positive purchase of cosmetics. In Column 2 the coefficient of the "log expenditures" variable is positive and statistically significant, confirming that cosmetics are a normal good. In this column we also find that while being married is positively related to average cosmetics expenditures (coefficient=0.115), married women age 18-40 report lower

[10] We note that a Chi-squared test fails to reject the null hypothesis that the two coefficients are equal (p-value=0.20).

average expenditures (coefficient=-0.069). We also find that unmarried women who are age 18-40 spend more on cosmetics (coefficient=0.098). These results complement our earlier finding and allow us to conclude that unmarried women age 18-40 purchase more cosmetics, and purchase them more frequently, than married women.

Recall that both African Americans and Hispanic/Latinos had a higher probability of purchasing cosmetics in Table 8. In Table 9 we see that households in those groups who do purchase them actually spend less on average than white households, although the difference is very small for Hispanic/Latino respondents. The opposite is the case for Asian respondents who spend more on cosmetics even though they were less likely to purchase them in the first place.

[Table 9]

In Column 3 of Table 9, we examine the change in cosmetics expenditures during the Great Recession. Here we find that among those who did purchase cosmetics, the recession was associated with a statistically significant *increase* in average cosmetics expenditures, as the lipstick effect hypothesis predicts. The coefficient of 0.094 (in log points) indicates about a 9.4% increase above the pre-Recession average cosmetics expenditure. However, there is still no statistically significant difference in consumption behavior between unmarried and married households, even though the coefficients are of opposite signs. The coefficients for the "female, married, age 18-40 during recession" and "female, unmarried, age 18-40 during recession" variables are not statistically significant. The fact that expenditure frequencies declined but average expenditures increased during the Great Recession could be explained by a substitution within cosmetics products towards more expensive ones.[11]

Finally, we return to the question of how expenditure patterns on cosmetics changed during the Great Recession among the employed. The "employed, recession" coefficient in Column 3 is not statistically significant, suggesting that the lipstick effect is not being driven by a desire for "employability". Thus, based on both an analysis of expenditure frequency and average expenditures, there is no evidence for the employment-based lipstick effect hypothesis.

To summarize our results thus far, we find that younger unmarried women consistently spend more and more frequently on cosmetics than their married counterparts. This fact is true regardless of economic conditions. During the Great Recession, there was an increase in average cosmetics expenditures, but it was not driven by unmarried women. In fact, married women increased their frequency of cosmetics purchase slightly during the Great Recession. These findings do not support a life cycle hypothesis which would explain the lipstick effect as a drive among unmarried women to attract a mate during troubled economic times. There is also no evidence that employed women changed their cosmetics expenditure habits during the Great Recession. Thus, while a few experimental studies have found evidence of the lipstick effect based on life cycle or employment-based hypotheses, we argue that it cannot be explained by either of them using microdata from the BLS' Consumer Expenditure Survey.

Substitution as the Major Explanation for the Lipstick Effect

[11] We thank an anonymous referee for this suggestion.

We turn to a purely psychological hypothesis for the lipstick effect, to wit: in response to the economic downturn, women chose to "treat" themselves more frugally by substituting out of higher-price expenditures and into cosmetics expenditures. In this section, we examine expenditures on other goods and services coverd by the Diary survey that could serve as substitutes for cosmetics: food away from home, alcoholic beverages, women's clothes, jewelry, and watches. The choice of these categories was motivated by data availability (i.e., the categories that the BLS draws from the Diary survey for its published reports) as well as the literature on visible goods, since visibility motivates conspicuous consumption (Heffetz 2011). We then examine the expenditure shares for these categories before and during the Great Recession to see which categories women were possibly substituting out of, in order to increase their expenditure share of cosmetics.

Columns 1 and 2 of Table 10 show that across the entire CEX Diary survey sample, there was a fall in expenditure shares for many categories between 2007 and the 2008-2010 period (the fall in consumption across most categories is also noted by De Nardi, French, and Benson 2011; also Petev, Pistaferri, and Eksten 2011). Cosmetics, food away from home, jewelry, women's clothes, and alcoholic beverage expenditure shares all fell. An exception is food at home expenditures, which are known to rise during economic downturns as consumers shift their time toward home production (Aguiar, Hurst, and Karabarbounis 2013; Nevo and Wong 2019).

[Table 10]

Turning to Columns 3 and 4 of Table 10, we see that for the subsample of women ages 18-40, cosmetics expenditure shares increased, while most other expenditure shares still decreased - again with the exception of food at home. These statistics suggest that, for a subsample of younger women, there was a substitution out of a broad range of expenditure categories that explains the increased expenditure share of cosmetics. Unfortunately, this also means a large pool of potential candidates for explaining the particular behavior motivated by the lipstick effect. Did women choose to eat at restaurants less often in order to indulge in more cosmetics, did they choose to forgo new clothing, or did they choose to substitute out of something else?

To pinpoint which expenditure category was being driven out of by the lipstick effect, note that the change in cosmetics shares observed in Columns 3 and 4 of Table 10 would still be explained by standard economic theory if the price of cosmetics relative to these other expenditure categories declined during the Great Recession. Essentially, the substitution effect would dominate the income effect in these cases. We noted above, however, that the decline in income during the Great Recession was steep – about 7.5%. Nevertheless, a large enough change in relative prices might explain some of the observed phenomena. We account for prices by presenting statistics on the Consumer Price Index (CPI) series published by the Bureau of Labor Statistics for each of these expenditure categories. We then compare the percentage change in prices derived from the subcategory CPIs to the change in expenditure shares, to see whether the relative price of cosmetics was also declining for those same expenditure categories that saw a reduced expenditure share.

The statistics presented in Column 5 of Table 10 show that the price index for alcoholic beverages, jewelry, and food away from home all increased at a faster rate than the price index for cosmetics,

implying that cosmetics were becoming cheaper relative to these goods and services, which could have spurred the substitution from these categories to cosmetics. While it is not clear whether the relative price changes would have been sufficiently high to counteract the income effect and drive cosmetics expenditures higher, the explanation is plausible.

The price indexes for watches and women's clothing both declined between these two periods. Thus, even as the relative price of cosmetics rose, we still observed an increase in cosmetics expenditure shares, and a decrease in watches and women's clothing shares, during the Great Recession.

Taking account of the magnitude of total "watches" and "women's clothing" expenditures (with the latter being about 10 times the former), we conclude that the evidence suggests a substitution away from women's clothing as the primary driver of the "lipstick effect". Especially when considering the similar visibility of women's clothing and cosmetics (Heffetz 2011), substituting out of women's clothing and into cosmetics is consistent with the psychological mechanism behind the lipstick effect. Further, while many expenditure categories declined during the Great Recession, it was only in women's clothes and watches that the categories declined in spite of their relative price declining. Given clothing is often cited in the popular media in the context of the lipstick effect, it is plausible that the psychological mechanism is the primary driver of it in the case of clothing, watches, or (possibly) jewelry.

Conclusion

The lipstick effect refers to the idea that as income declines, women purchase more lipstick and other cosmetics products in order to raise their status during uncertain economic times. Since standard economic theory predicts that consumption should fall when income decreases, three alternative explanations for the lipstick effect have been provided. One hypothesis states that women substitute away from higher-price luxury goods and toward lower-price ones in order to "treat" themselves in a more frugal way. A second hypothesis states that women devote more resources to finding a mate when times are uncertain – the so-called life cycle hypothesis. A third hypothesis states that women purchase more beauty-enhancing products and choose to be more social in order to find a job (or keep one) as the unemployment rate increases.

Using household-level data from the Bureau of Labor Statistics' Consumer Expenditures Survey and the Great Recession as our case study, we do not find evidence of the life cycle or employment-based hypotheses. While we find that single women spend more (and a higher share of their income) on cosmetics than married women, this is true both during as well as before and after the Great Recession. Thus, there might be some truth to the life cycle theory, but it cannot be used to explain the changes in consumption that happen during a recession. Instead, we argue that younger women substitute out of other expenditure categories like eating at restaurants, jewelry, and clothes, in order to purchase more cosmetics.

We hope that our research has shed light on an interesting phenomenon in consumer and behavioral economics, as well as more broadly on the question of how people adjust their spending during an economic downturn. Future research should explore whether men also have products like lipstick that they spend more on during recessions. Given that Bor et al. (2013) found that spending on

alcoholic beverages increased during the Great Recession, it is possible that purchases of craft beer or a nice bottle of whiskey increased for similar reasons – to wit, men felt the need to "reward" themselves in fiscally manageable ways. Additionally, certain forms of entertainment such as videogames might be ways to treat oneself during difficult economic times, especially if one becomes unemployed and has more time for these activities.

References

Mark Aguiar and Mark Bils. 2015. "Has Consumption Inequality Mirrored Income Inequality?" *American Economic Review* 105 (9): pp. 2725-2756.

Mark Aguiar, Erik Hurst, and Loukas Karabarbounis. 2013. "Time Use During the Great Recession." *American Economic Review* 103 (5): pp. 1664-96.

Adam Bee, Bruce D. Meyer, and James X. Sullivan. 2012. "The Validity of Consumption Data: Are the Consumer Expenditure Interview and Diary Surveys Informative?" *NBER Working Paper Number 18308*.

Jacob Bor, Sanjay Basu, Adam Coutts, Martin McKee, and David Stuckler. 2013. "Alcohol Use During the Great Recession of 2008-2009." *Alcohol and Alcoholism* 48 (3): 343-348.

Patrick J. Byrne, Oral Capps, Jr., and Atanu Saha. 1996. "Analysis of Food-Away-from-Home Expenditure Patterns for U.S. Households, 1982-1989." *American Journal of Agricultural Economics* 78 (August): 614-627.

Caroline Chiaroni. 2016. "Do Household Substitute Among Luxury Goods? The Impact of the Great Recession on Fragrance Consumption." Undergraduate Thesis, Department of Economics, Princeton University.

Jeffrey Gonzalez, Catherine Hackett, Nhien To, and Lucilla Tan. 2009. "Definition of Data Quality for the Consumer Expenditure Survey: A Proposal". Bureau of Labor Statistics. Accessed online (January 18, 2020) from https://www.bls.gov/cex/ovrvwdataqualityrpt.pdf.

Tanya Mark, Colette Southam, Jan Bulla, and Sergio Meza. 2016. "Cross-Category Indulgence: Why Do Some Premium Brands Grow During Recession?" *Journal of Brand Management* 23 (5): 114-129.

Mariacristina De Nardi, Eric French, and David Benson. 2011. "Consumption and the Great Recession". *NBER Working Paper Number 17688*.

The Economist. 2009. "Lip Reading." Print edition (January 2009). Accessed online (January 18, 2020) from https://www.economist.com/business/2009/01/22/lip-reading.

Larry Elliott. 2008. "Into the Red: 'Lipstick Effect' Reveals the True Face of the Recession." *The Guardian*. Accessed on August 31, 2019 from https://www.theguardian.com/business/2008/dec/22/recession-cosmetics-lipstick.

Rebecca W. Hamilton, Chiraag Mittal, Anuj Shah, Debora V. Thompson, Vladas Griskevicius. 2019. "How Financial Constraints Influence Consumer Behavior: An Integrative Framework." *Journal of Consumer Psychology* 29 (2): 285-305.

Ori Heffetz. 2011. "A Test of Conspicuous Consumption: Visibility and Income Elasticities." *Review of Economics and Statistics* 93 (4): 1101-1117.

Sarah E. Hill, Christopher D. Rodeheffer, Vladas Griskevicius, Kristina Durante, and Andrew Edward White. 2012. “Boosting Beauty in an Economic Decline: Mating, Spending, and the Lipstick Effect.” *Journal of Personality and Social Psychology* 103 (2): 275-291.

Hyeongwoo Kim and Liping Gao. 2017. “Consumer Spending on Entertainment and the Great Recession.” *Auburn University Department of Economics Working Paper AUWP2017-07*.

Nancy F. Koehn. 2001. “Estee Lauder and the Market for Cosmetics.” *Harvard Business School Cases* 801-362: 1-44.

Arthur Lewbel. 2006. “Engel Curves.” *New Palgrave Dictionary of Economics (2nd edition)*.

Amy Martinez and Melissa Allison. September 9, 2010. “Beauty-Products Sales Bright Spot During Recession.” *The Seattle Times*.

Ekaterina Netchaeva and McKenzie Rees. 2016. “Strategically Stunning: The Professional Motivations Behind the Lipstick Effect.” *Psychological Science* 27 (8): 1157-1168.

Aviv Nevo and Arlene Wong. 2019. “The Elasticity of Substitution Between Time and Market Goods: Evidence from the Great Recession.” *International Economic Review* 60 (1): 25-51.

Ivaylo Petev, Luigi Pistaferri, and Itay Saporta Eksten. 2011. “Consumption and the Great Recession: An Analysis of Trends, Perceptions, and Distributional Effects.” Unpublished manuscript

Kayleen Schaefer. May 1, 2008. “Hard Times, But Your Lips Look Great.” *The New York Times*.

Danielle L. Wagstaff. 2018. “Comparing Mating Motivations, Social Processes, and Personality as Predictors of Women’s Cosmetic Use.” *Evolutionary Behavioral Sciences* 12 (4): 367-380.

Shuoli Zhao, Chengyan Yue, Mary H. Meyer, and Charles Hall. 2016. “Factors Affecting U.S. Consumer Expenditures of Fresh Flowers and Potted Plants.” *HortTechnology* 26 (4): 484-492.

Table 1: Sample Sizes for the Consumer Expenditure Survey - Diary Data

	Total	Married	%	Female	%
2005	14,006	7,644	54.6	7,530	53.8
2006	13,346	7,310	54.8	7,060	52.9
2007	12,624	6,887	54.6	6,550	51.9
2008	13,011	7,055	54.2	6,938	53.3
2009	13,302	7,178	54.0	7,155	53.8
2010	12,965	6,880	53.1	6,943	53.6
2011	12,647	6,735	53.3	6,855	54.2
2012	12,466	6,476	51.9	6,710	53.8
2013	11,207	5,901	52.7	5,961	53.2
2014	12,175	6,350	51.2	6,491	53.3
Sum	127,175	68,416	53.8	68,193	53.6

Source: Bureau of Labor Statistics, Consumer Expenditure Survey Public Use Microdata, 2005-2014

Notes: Sample sizes refer to "Consumer Units", which are essentially households. Sample sizes calculated based on all Consumer Units reporting positive expenditures. "Female" refers to the amount of primary survey respondents (not necessarily heads of household) who are female.

Table 2: Weighted Sample Summary Statistics		
	Mean	Standard deviation
Cosmetics purchase (=1 if yes, =0 if no)	0.222	0.42
Log cosmetics	5.91	1.08
Log total expenditure	9.94	1.25
Age	49.40	17.05
Family size	2.53	1.47
Age 18-40	0.335	0.47
Female	0.534	0.50
Married	0.536	0.50
Employed	0.683	0.47
White	0.822	0.38
Black	0.114	0.32
Hispanic	0.113	0.32
HS only (=1 if yes, 0 if no)	0.258	0.26
Some college or AA Degree	0.309	0.31
Bachelor's degree	0.198	0.40
Master's, Professional, or PhD	0.108	0.31
Observations	127,749	

Source: Bureau of Labor Statistics, Consumer Expenditure Survey Public Use Microdata, 2005-2014.

Notes: Sample size for "log cosmetics" is 28,409. Means for dummy and categorical variables can be converted to percentages by multiplying by 100; for example, according to the table, 22.2% of households reported making a cosmetics purchase. Estimates for "female" and "married" differ slightly from Table 1 because here, weighted estimates are not used.

Table 3: Total Expenditure Estimates (Billions), Consumer Expenditure Survey (Diary Survey), 2005-2014			
	Cosmetics	Food at home	Food away from home
2005	$15.511	$381.632	$259.164
2006	$18.094	$400.298	$271.723
2007	$18.262	$411.063	$268.490
2008	$18.225	$445.560	$272.963
2009	$17.304	$447.728	$265.615
2010	$16.224	$432.892	$253.100
2011	$20.779	$461.961	$273.727
2012	$19.503	$480.661	$277.075
2013	$18.327	$494.250	$286.374
2014	$21.396	$496.839	$302.113
Source: BLS Consumer Expenditure Survey Microdata, 2005-2014.			

Table 4: Cosmetics Purchase Frequencies (%), 2005-2014			
2005	23.39	2011	22.83
2006	23.41	2012	21.65
2007	22.13	2013	20.81
2008	22.55	2014	21.55
2009	22.10		
2010	21.73		
Source: BLS Consumer Expenditure Survey Microdata, 2005-2014. *Notes*: "Frequencies" refer to the percentage of the sample that reported making some positive purchase on cosmetics products during the 2-week period in which they filled out their diary.			

Table 5: Average Annual Cosmetics Expenditures and Expenditure Shares by Income Quintile (Weighted), 2005-2014		
	Average expenditures	Expenditure shares (%)
1st quintile (0-20th percentile)	$58.89	0.310
2nd quintile (20-40)	$86.46	0.341
3rd quintile (40-60)	$111.46	0.376
4th quintile (60-80)	$151.85	0.407
5th quintile (>80th percentile)	$240.30	0.439
Source: Bureau of Labor Statistics, Consumer Expenditure Survey Public Use Microdata, 2005-2014.		

Table 6: Weighted Average Expenditures and Expenditure Shares for Select Categories, Diary Survey, 2005-2014

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
All expenditures	$40,691.52	$39,946.22	$40,786.34	$43,330.73	$40,771.18	$39,792.38	$41,816.02	$42,870.93	$42,213.28	$42,731.56
Cosmetics	$142.74	$164.91	$165.48	$164.65	$157.34	$148.06	$187.33	$172.73	$160.02	$184.63
%	0.35	0.41	0.41	0.38	0.39	0.37	0.45	0.40	0.38	0.43
Women's clothes	$356.43	$353.86	$478.48	$465.37	$437.75	$449.89	$472.98	$445.16	$574.43	$599.99
%	0.88	0.89	1.17	1.07	1.07	1.13	1.13	1.04	1.36	1.40
Food at home	$3,512.08	$3,648.26	$3,724.76	$4,025.39	$4,071.15	$3,950.39	$4,164.78	$4,256.98	$4,315.50	$4,287.43
%	8.63	9.13	9.13	9.29	9.99	9.93	9.96	9.93	10.22	10.03
Food away from home	$2,385.03	$2,476.43	$2,432.86	$2,466.07	$2,415.21	$2,309.69	$2,467.77	$2,453.92	$2,500.45	$2,607.05
%	5.86	6.20	5.96	5.69	5.92	5.80	5.90	5.72	5.92	6.10

Source: Bureau of Labor Statistics, Consumer Expenditure Survey Public Use Microdata, 2005-2014.

Notes: Estimates are weighted using the BLS-provided sample weights and are deflated by the CPI for the associated expenditure category, so that they represent expenditures in constant 2014 dollars. The "%" column indicates expenditure shares.

Table 7: Average Cosmetics Expenditures (and Expenditure Shares) by Subgroup, 2005-2014			
	Age 18-40		Age greater than 40
	Unmarried	Married	
2005	$169.72	$162.16	$140.30
	(0.80)	(0.49)	(0.52)
2006	$142.82	$217.10	$178.88
	(0.80)	(0.60)	(0.69)
2007	$139.27	$161.72	$186.73
	(0.69)	(0.53)	(0.62)
2008	$152.74	$226.09	$171.61
	(0.74)	(0.61)	(0.58)
2009	$152.55	$172.02	$175.27
	(0.81)	(0.53)	(0.59)
2010	$183.13	$183.55	$169.87
	(0.75)	(0.60)	(0.65)
2011	$209.06	$230.18	$206.18
	(0.99)	(0.65)	(0.71)
2012	$163.46	$208.12	$192.60
	(0.83)	(0.67)	(0.66)
2013	$153.16	$180.69	$186.48
	(0.69)	(0.45)	(0.61)
2014	$152.52	$188.25	$226.81
	(0.85)	(0.54)	(0.79)

Source: BLS Consumer Expenditure Survey Microdata, 2005-2014.

Notes: Expenditure shares reported as percentages in parentheses. For example, in 2005, unmarried women age 18-40 spent $169.72 on cosmetics, on average, which represented 0.80% of their total reported expenditures.

Table 8: Predictors of the Probability of Purchasing Cosmetics (Reported as Odds Ratios)			
	(1)	(2)	(3)
Age 18-40	1.04	0.96	1.02
	(0.03)	(0.03)	(0.04)
Female	1.34***	1.40***	1.40***
	(0.03)	(0.03)	(0.03)
Married	1.81***	1.51***	1.51***
	(0.04)	(0.03)	(0.03)
Female*Married*18-40	0.93*	0.93*	0.87**
	(0.04)	(0.04)	(0.05)
Female*Single*18-40	1.20***	1.19***	1.17***
	(0.05)	(0.05)	(0.07)
Recession			0.91***
			(0.03)
Married*Female*18-40*Recession			1.14*
			(0.08)
Single*Female*18-40*Recession			1.03
			(0.08)
Employed*Recession			1.01
			(0.04)
Black		1.15***	1.15***
		(0.03)	(0.03)
Hispanic/Latino		1.40***	1.40***
		(0.04)	(0.04)
Asian		0.88***	0.88***
		(0.04)	(0.04)
Employed		1.08***	1.07**
		(0.02)	(0.03)

Year Dummies	Yes	Yes	Yes
Observations	126,473	126,473	78,154

Source: Bureau of Labor Statistics, Consumer Expenditure Survey Public Use Microdata, 2005-2014.

Notes: Coefficients greater than 1 indicate an increased odds of purchasing cosmetics while coefficients less than 1 indicate decreased odds. Heteroskedasticity-robust standard errors reported in parentheses. ***: p<0.01; **: p<0.05; *: p<0.1. Column 3 coefficients come from a regression estimated on the 2005-2010 subsample (hence the lower observations).

Table 9: Predictors of Cosmetics Expenditures

	(1)	(2)	(3)
Log(Total Expend)	0.33***	0.29***	0.29***
	(0.01)	(0.01)	(0.01)
Age 18-40	-0.05**	-0.05**	-0.06*
	(0.02)	(0.02)	(0.03)
Married	0.11***	0.11***	0.11***
	(0.02)	(0.02)	(0.02)
Female*Married*18-40	-0.04	-0.04	-0.03
	(0.03)	(0.03)	(0.05)
Female*Single*18-40	0.12***	0.12***	0.15***
	(0.04)	(0.04)	(0.05)
Recession			0.09***
			(0.03)
Married*Female*18-40*Recession			-0.02
			(0.06)
Single*Female*18-40*Recession			-0.06
			(0.06)

Employed*Recession			0.03
			(0.03)
Black		-0.20***	-0.20***
		(0.02)	(0.02)
Hispanic/Latino		-0.002	-0.003
		(0.02)	(0.02)
Asian		0.16***	0.16***
		(0.04)	(0.04)
Employed		0.05***	0.04
		(0.02)	(0.03)
Year Dummies	Yes	Yes	Yes
R^2	0.1281	0.2149	0.2280
Observations	27,133	27,133	17,128

Source: Bureau of Labor Statistics, Consumer Expenditure Survey Public Use Microdata, 2005-2014.

Notes: Heteroskedasticity-robust standard errors reported in parentheses. ***: p<0.01; **: p<0.05; *: p<0.1. Column 3 coefficients come from a regression estimated on the 2005-2010 subsample (hence the lower observations).

Table 10: Expenditure Shares and Price Changes of Select Expenditure Categories, 2007 and 2008-2010					
	Expenditure Share (%), Full Sample		Expenditure Share (%), Women Age 18-40		% Change Price Index
	2007	2008-2010	2007	2008-2010	2007 to 2008-2010
Cosmetics	0.374	0.372	0.429	0.442	2.4
Food at home	19.642	20.977	19.379	21.040	6.8
Food away from home	7.947	7.586	8.445	8.067	7.3
Jewelry	0.006	0.005	0.006	0.005	10.4
Women's Clothes	0.853	0.785	1.053	1.030	-2.2
Alcoholic Beverages	0.743	0.695	0.727	0.657	6.0
Watches	0.028	0.021	0.029	0.020	-0.5
Source: Author's calculations based on Bureau of Labor Statistics' Consumer Expenditure Survey and Bureau of Labor Statistics' Consumer Price Index Series.					