DRESS FOR SUCCESS --
DOES PRIMPING PAY?

Daniel S. Hamermesh
Xin Meng
Junsen Zhang

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ABSTRACT

A unique survey of Shanghai residents in 1996 that combined labor-market information, appraisals of respondents' beauty, and household expenditures allows us to examine the relative magnitudes of the investment and consumption components of women's spending on beauty-enhancing goods and services. We find that beauty raises women's earnings (and to a lesser extent, men's) adjusted for a wide range of controls. Additional spending on clothing and cosmetics has a generally positive but decreasing marginal impact on a woman's perceived beauty. The relative sizes of these effects demonstrate that such purchases pay back at most 10 percent of each unit of expenditure in the form of higher earnings. Most such spending represents consumption.

Daniel S. Hamermesh
Department of Economics
University of Texas
Austin, TX 78712-1173
and NBER
hamermes@eco.utexas.edu

Xin Meng
Research School of Asian and Pacific Studies
Australian National University
Canberra, ACT Australia
Xin.Meng@anu.edu.au

Junsen Zhang
Department of Economics
Chinese University of Hong Kong
Shatin, N.T. Hong Kong
b578736@mailserv.cuhk.edu.hk

I. The General Problem

Recent research (Hamermesh and Biddle, 1994) has demonstrated the impact of workers' looks on their earnings adjusted for a very wide variety of other characteristics. A subsequent study (Biddle and Hamermesh, 1998) showed that this effect exists within a narrowly defined occupation, and that beauty generates both static and dynamic impacts on workers' occupational choices. This research, and the several prior studies that estimated simple correlations between looks and earnings, is necessarily based on the notion that the worker's beauty is inherent. No inquiry has been made into how workers' looks might be affected by their efforts to ameliorate deficiencies in pulchritude and how those efforts might affect labor-market outcomes. Part of the reason for this lacuna may simply be a failure to consider this line of causation. More likely, however, the lack of research on this issue has been due to the complete absence of any data set that provides researchers with information on earnings, beauty <u>and</u> workers' efforts to improve their looks.

Fortunately in 1996 the Institute of Population Studies of the Shanghai Academy of Social Sciences (SASS) began a survey of members of households in Shanghai, China. This survey provided information on their labor-market status, including their earnings, as well as all the usual demographic information. It also obtained information (based on the interviewers' ratings) on the looks of the respondents. In addition, and most important for our purposes, information on each household's expenditures in a wide variety of categories was collected, with wives' spending on clothing and cosmetics included as one of those categories. These data enables us to study the extent to which (female) workers can improve their economic status by spending on those goods and services that might enhance their appearance.

Beauty spending provides one example of a type of spending on personal characteristics that may be malleable using purchased goods and/or time and that might pay off in the labor market. By

linking the two steps in the process from spending, to changes in the characteristic, to labor-market outcomes, our analysis provides an example that might be useful in constructing studies to examine the relative importance of consumption and investment motives in spending on a number of other personal characteristics, including education and health.

The next section presents a theoretical motivation for the empirical work, one that focuses on what we might expect to be the impact of marginal spending on appearance on earnings. The third section introduces the new data set that we use here. Section IV presents empirical analyses of the relationships between looks and earnings, and spending on beauty and looks, Section V uses the results to infer the average and marginal impacts of such spending, while Section VI considers possible problems with the estimates and their broader applicability.

II. A Simple Model of Wages and Beauty Expenditures

We assume that "beauty is in the eye of the beholder," but that beholders within an economy, including those who offer jobs, have preferences for beauty that are somewhat correlated.[1] Most important for our purposes, we allow for the possibility that workers (and potential workers), being aware of this, will invest in those activities that enhance their appearance and thus their earnings. Included in these "beauty items" might be such long-term investments as plastic surgery or attendance at charm schools, and such ongoing purchases as clothing, hair/facial styling, cosmetics, etc.

Let X be the vector of all non-beauty goods purchased, and X_B be an additional good, the services from purchased beauty items. The worker maximizes the utility function U(X) subject to:

$$X_B + \Sigma p_i X_i = W(B) ,$$

[1] See the massive amount of evidence on this point summarized by Etcoff (1999).

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where B is the worker's beauty capital, the price of beauty items is normalized to 1, and W is the worker's wage, a function of, among other things, his/her beauty. In this first model the beauty that X_B might generate yields no utility per se, since purchases of X_B are only an investment that enhances the worker's earnings. All the other factors that affect wages are subsumed in the function W. For simplicity we assume that hours of work per time period are fixed, and that the goods in the vector X are defined commensurately with that assumption. We assume that B is a function of spending on beauty items and of B_0, the worker's beauty absent any spending on beauty items (his/her inherent beauty):

(1) $B = B(X_B, B_0)$,

with B_1 and $B_2 > 0$, and $B_{11} < 0$. As with most other earnings-augmenting activities, we thus assume diminishing returns to additional spending in this beauty production function.[2] The sign of B_{12} is ambiguous: Whether the gains to spending on beauty items are inherently greater or smaller for people who are inherently better looking is unclear a priori.

The worker's maximization of utility for each good i in the vector X is standard. But the worker also chooses X_B so that:

(2) $[dW/dB][dB/dX_B] - 1 = 0$.

Under the assumption about the arguments of U, at the margin the last dollar spent on beauty items will yield one dollar in extra wages. Given the shape of the beauty production function B, this means that the average dollar spent on beauty will return more than one dollar in extra earnings.

The assumption that enhancing one's wage is the only purpose of purchasing beauty items to improve one's appearance is difficult to credit. It is quite possible that such spending pays off in

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[2] This means that we are assuming that the old nostrum, "You can't make a silk purse out of a sow's ear," applies, but that the ear's appeal can be improved upon somewhat.

other markets (and Hamermesh and Biddle, 1994, provide some evidence of a payoff in the marriage market). Perhaps even more important, spending on beauty items may partly be pure consumption: Beauty may not only be an intermediate input that leads to gains in the labor and other markets. We thus expand the worker's utility function to:

(3) $\quad U = U(X, B)$,

$U_B > 0$, $U_{BB} < 0$. (One might expand (3) still further to include the beauty of other people with whom one comes into contact, from co-workers to friends to shopkeepers, but that expansion would not alter the positive implications of this derivation.) The worker will choose X_B to satisfy:

(4) $U_B dB/dX_B + \lambda\{[dW/dB][dB/dX_B] - 1\} = 0$,

where λ is the Lagrangean multiplier in the worker's budget constraint. In this case the effect on earnings of the marginal dollar spent on beauty items is less than one dollar, because that spending also yields satisfaction independent of its impact on the goods that might be bought with the higher wages that the beauty items can generate. Even without a pure investment motive, however, it is quite possible that the productivity of the average dollar spent on beauty exceeds one dollar.

The empirical analysis in this study focuses on the bracketed {} term in (4). Our goal is to determine whether on average or at the margin spending on beauty items yields a payoff in the form of higher earnings and, if so, whether that payoff alone justifies spending on these items. In other words, is such spending at least partly an investment and, if so, what fraction of it can be viewed as investment rather than consumption?

III. Data

The data used in this study come from a survey conducted in Shanghai, China, early in 1996 in which a stratified multi-stage sample of 3000 individuals ages 15 to 64 was questioned. The

households contacted provided information on the labor-market status and outcomes of the household head and spouse and on monthly expenditures in a variety of categories. Ten items, such as rent, transportation and food, were included, with spending in the specified categories comprising over 90 percent of the average household's total expenditures. Among the categories were "spending on husband's tobacco and alcohol" and "spending on wife's clothing and cosmetics," with these reported by the particular spouse who did the spending. Expenditures in the latter category provide the information that we use to measure X_B, women's spending on beauty items.

At the end of the interview the interviewer rated the respondent's appearance on a five-point scale using the categories (translated from the Chinese): 1) Very pretty; 2) Pretty; 3) Average; 4) Below-average; 5) Ugly. These measures of beauty form the basis for the empirical analog to B in Section II. The survey also provides information on the respondent's self-reported health status (a five-point scale ranging from very good to very bad) and on his/her height and weight. This latter allows us to calculate a Body Mass Index, BMI = Weight in kg./(Height in m.)^2. Together these measures should enable us to separate the impacts of pure physical appearance from any possible productivity-enhancing effects of good health or of brawn, or possible productivity-decreasing effects of obesity. Their inclusion in the sample and our ability to control for them mean that the measures of looks that we use here are freer of contamination by other aspects of appearance related to beauty than any others in the literature.

In order to avoid heterogeneity in the composition of the sample we restrict the analysis to men and women who were: Han Chinese; had a BMI ≥ 17;[3] worked at least 30 hours per week; were wage and salary earners; resided permanently in Shanghai; were between ages 22 and 60; and were

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[3] This restriction follows Fogel (1994).

not recent migrants to Shanghai. Since only tiny fractions (1 percent of the women, 2 percent of the men) of the workers who otherwise qualified for inclusion in these subsamples were unmarried, we further restricted the subsamples to married workers with spouse present, leaving final subsamples for use in estimation of 853 women and 1007 men.

The upper panel of Table 1 presents the distributions of the appearance of the workers in these subsamples. Compared to similarly constructed ratings in surveys conducted in North America (Hamermesh and Biddle, 1994), there is much less weight in the lower tails of the distributions of looks, and more workers are rated in the highest category. As in the surveys used in that study, however, and as is found generally (Hatfield and Sprecher, 1986) female respondents are less likely than men to be rated average. The paucity of observations at the extremes leads us to base the analysis on either the threefold classification – good-looking (top two categories), average, and bad looking (bottom two categories) – or on the twofold classification – good-looking and other.

Table 1 also presents statistics describing women's spending on beauty items and the total expenditures of the households that contain those women. While the mean monthly expenditure on these beauty items is only 88 yuan, the sample contains a very long right tail: Four percent of the respondents spend more than 200 yuan per month on these items, and the maximum is over 10 times the mean. This skewness suggests that there is ample room for examining the possible role of nonlinear effects of such spending on B, i.e., of examining the sign of B_{11}. Finally, it is worth noting that in the average household spending on women's clothing and cosmetics accounts for 4.5 percent of total household income. This percentage is quite high by Western standards; but differences in survey definitions and in real incomes make this figure credible.[4]

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[4] Lundberg et al (1997) report expenditures on women's clothing as averaging 2.8 percent of total household consumption in the United Kingdom between 1973 and 1990. In the United States in 1994-95 spending on women's

Table 1. Workers' Appearance and Spending on Beauty Items, Shanghai 1996

	Women (N=853)	Men (N=1007)
Appearance Category (percent distribution):		
Very pretty	6.33	5.46
Pretty	28.49	24.63
Average	64.01	68.52
Below average	1.06	1.29
Ugly	0.12	0.10

Expenditure on beauty items (yuan/month):

Mean	88.27
Std. Dev.	92.09
Minimum	0
Maximum	1000

Total household income (yuan/month):

Mean	1942.46
Std. Dev.	925.39
Minimum	0
Maximum	9000

IV. Impacts of Looks on Earnings, and of Beauty Spending on Looks

As a first cut at the data we present estimates of the relationship between looks and earnings without any controls for other determinants of earnings. For purposes of estimation the latter are measured as (the logarithm of) hourly earnings in this sample of full-time workers. This specification obviates most of the need for concern about labor-supply issues within this sample.[5] The upper panels in Table 2 for women and Table 3 for men present these results for the two vectors of indicator variables that span the information on the workers' appearance. The estimates in Table 2 yield a fairly clear conclusion: Women in the top two groups earn significantly more than the nearly two-thirds of workers whose looks are considered average, while the tiny (2 percent) of workers whose looks are below average suffer a huge earnings penalty. When looks are classified into just two categories these main results change very little. Women in the top 35 percent of appearance earn significantly more than women whose beauty is rated average or below.

The second panel in each table presents the results on which we focus most of the attention here and in the next section. The log-earnings equations contain a wide variety of the usual controls, including years of formal education, and years of work experience both prior to the current job and with the current employer (both included as quadratics). A vector of indicators spanning the workers' responses about their health is included, as is a quadratic in the Body Mass Index and indicators of the presence of a young child and whether the worker received formal on-the-job

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clothing was 1.6 percent of total expenditures in married-couple households (BLS, 1997). Our category X_B is broader than women's clothing alone, so that the expenditure share here is not so outlandishly high as it might seem. Perhaps most important, it is likely that clothing/cosmetics are necessities, so that they are unsurprisingly a greater fraction even of total income in Shanghai than in the higher-income British and U.S. economies.

[5] All the regressions were reestimated using the log of monthly earnings as the dependent variable, and including weekly hours as an independent variable. The changes in the coefficients of the beauty measures from those presented in Tables 2 and 3 were minuscule.

Table 2. Effects of Beauty on Log(Hourly Earnings), Women[1]

Beauty Measure:

Good Looking	Bad Looking	Adj. R^2
No controls		
0.135	-0.348	0.026
(0.032)	(0.143)	
0.141		0.021
(0.032)		
Controls		
0.099	-0.302	0.143
(0.032)	(0.141)	
0.105		0.140
(0.032)		
Controls and Interviewer Indicators		
0.098	-0.205	0.256
(0.037)	(0.137)	
0.103		0.254
(0.036)		

[1]Here and in Tables 3 and 4 the numbers in parentheses are standard errors. The regressions here and in Table 3 that include controls also contain: Vectors of self-reported health indicators, of indicators of industry, of occupation and of place of birth; linear and quadratic terms in years of job tenure, experience prior to the current job, and the Body Mass Index; a linear measure of years of schooling; and indicators of formal on-the-job training, of working in the state sector, and of the presence of a young child in the household.

training at this firm. Finally, vectors of indicators for essentially one-digit industry and one-digit occupation are also included, as is an indicator of employment in the state sector.

Because the impacts of all these control variables on earnings are qualitatively similar to what is standard in the literature on Western economies, we do not bother presenting the coefficients here. Suffice it to note that despite their inclusion the fraction of the variance in earnings that is explained by this fairly standard set of variables is somewhat lower than in studies of earnings in Western economies that are based on micro data. Given the information that is available in the survey, we cannot go beyond what is here; and other estimates of wage equations on Shanghainese data explain similarly low fractions of variance, suggesting that wage-setting in Shanghai has fewer deterministic components than that in industrialized Western labor markets.

The estimated effects of appearance on earnings change remarkably little among female workers once we hold constant for this large vector of other determinants of earnings. Good-looking women, those in the top 35 percent of women arrayed by appearance, earn roughly 10 percent more than the large majority of women whose looks are considered average. These latter women, in turn, earn nearly 30 percent more than the tiny fraction of women workers whose looks are rated below average. Given the distribution of married female workers by category of looks, we view the results in the bottom row of this panel, in which workers are classified as good-looking or not, as the most useful for our purposes.

When no controls are included (top panel of Table 3), we find significant effects of the looks indicators on men's earnings (although smaller impacts than in the comparable equations for female workers). When the vector of other determinants is added to the equations describing men's earnings (in the second panel of Table 3), much of the implied effect of their looks disappears. While the

Table 3. Effects of Beauty on Log(Hourly Earnings), Men

| | Beauty Measure: | |
Good Looking	Bad Looking	Adj. R^2
	No controls	
0.085 (0.032)	-0.314 (0.124)	0.013
0.092 (0.032)		0.007
	Controls	
0.027 (0.032)	-0.222 (0.119)	0.157
0.032 (0.032)		0.154
	Controls and Interviewer Indicators	
0.025 (0.035)	-0.145 (0.111)	0.304
0.027 (0.035)		0.304

small number of men whose looks are rated below-average do earn substantially less than other men, the 30 percent who are rated above-average earn little and only insignificantly more than the bulk of otherwise identical men.

The differences in the results by sex stand in stark contrast to those for similar specifications for North America (Hamermesh and Biddle, 1994). Appearance there generally has a slightly smaller impact on earnings among women than among men, perhaps because women's looks are valued more in the marriage market than are men's. That we find the opposite result here is very hard to explain, other than by cultural differences that might place greater weight on female than male beauty in all markets.[6]

The survey was conducted by 60 interviewers, each of whom completed interviews of approximately 50 adults. It is quite possible that some interviewers' ratings were generous while others' were harsh, and that the relative generosity of the ratings was correlated with the other determinants of earnings. Accordingly, the third panel in each table reports the results of reestimating the earnings equations including an additional vector of variables representing interviewer fixed effects. The coefficients on the indicator for below-average looks drop substantially, not surprising given the tiny numbers in this category. Beyond that, however, the estimates are quite similar to those presented in the second panel in each table. There are no significant effects of looks among men (although even here, below-average looking men earn less than others), while better-looking women earn roughly 10 percent more than others, an impact that is highly significant statistically.

With the exception of the reversal of the relative sizes of the impacts by sex, the various results here replicate those found for North America. This replication is interesting; but the

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[6] That the traditional Chinese proverb, "Women rely on beauty, men on intelligence," is still in circulation suggests that these cultural factors may indeed explain the differences.

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equations are mainly inputs into the central purpose of this study, namely inferring the monetary

payoff to spending on beauty. Accordingly, we proceed to estimate beauty production functions that

describe a woman's looks by a quadratic function of her spending on beauty items and by measures

that might affect B_0. We concentrate on women because data on beauty spending are unavailable

for men in the survey. All the equations contain the same vector of indicators of self-reported health

status that was included in the earnings equations, along with a quadratic in the woman's age. The

first set of estimates is a simple probit defined over the indicator for above-average looks, while the

second set of equations estimates an ordered probit defined over the categories above-average,

average and below-average appearance. In each case we also estimate specifications including

interviewer fixed effects.

The coefficients from these specifications of the beauty production function are presented

in Table 4. Whether we define appearance over two categories or over three, we observe an inverse-

U shaped effect of spending on beauty items. In the estimates without interviewer fixed effects the

impact of spending on beauty items on appearance is highly significant (p=.001 in both the simple

and ordered probits). Once we add interviewer fixed effects the impact is mitigated and is no longer

significantly nonzero at standard levels (p=.131 in the probit, p=.130 in the ordered probit). Despite

this, the results do allow us to infer that spending on beauty items has the expected effect on

appearance – positive but decreasing. Moreover, while these estimates suggest $B_{11} < 0$, the peak of

the total impact of spending is over 440 yuan per month, so that the marginal effect of beauty

spending is negative for only 8 of the 853 women in the sample.[7]

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[7] This might be called the Tammy Faye Bakker section of the sample. Even this spending may be rational if the extra nonpecuniary satisfaction from spending per se is sufficiently large.

Table 4. Effects of Clothing/Cosmetics Spending on Appearance, 853 Married Shanghai Female Workers, 1996[1]

Dependent Variable:	Spending	Spending²/1000	Pseudo-R^2	Interviewer Controls
	Probit Coefficients			
Good-Looking	0.00323 (0.00091)	-0.00366 (0.00158)	0.053	No
	0.00237 (0.00123)	-0.00269 (0.00214)	0.238	Yes
	Ordered Probit Coefficients			
Looks	0.00300 (0.00085)	-0.00331 (0.00137)	0.044	No
	0.00204 (0.00108)	-0.00209 (0.00169)	0.303	Yes

[1]Also included in each equation are a vector of three indicators of self-reported health status and quadratics in the BMI and the woman's age. The equations with interviewer controls also include indicators for each of the 60 interviewers. In the probits that include interviewer controls 162 observations were predicted perfectly by the interviewer control and the other variables, and were automatically dropped from the estimation. In the ordered probits that contained interviewer controls 38 observations

We envision appearance as being determined in (1) by the worker's inherent characteristics and by her combining them with the goods that we call beauty items. The question is to what extent can the purchase of these items enhance her beauty? Taking the coefficients in the probit that excludes interviewer effects, if the typical woman spent nothing on beauty the probability of her being rated good-looking would drop from the population mean of 0.35 to 0.26. Obversely, even if she spent to achieve the maximum effect of such spending, she still would have only a 0.53 probability of being rated good-looking. Once one accounts for interviewer fixed effects the implied impact of spending on beauty is even smaller, with the woman spending nothing having a 0.28 probability of being rated good-looking, and the woman whose spending achieves the maximum effect having a 0.48 probability of being rated good-looking. In short, the estimates suggest very clearly that, while spending on beauty items has the predicted effect, and while the marginal impact of that spending declines, the overall impact on a woman's perceived beauty is relatively small.

One might believe that the impact of beauty spending on beauty varies with women's objective characteristics. For example, more educated women may use their human capital to generate a greater effect on their appearance per unit of X_B. Women who are older might find it more difficult to generate improvements in beauty through additional spending (and through force of habit may still be spending what younger women do). Additional stories can be constructed for other characteristics. To examine these ideas we included in the probits and ordered probits successive interactions of the quadratic in X_B with such measures as years of schooling, age, years since marriage, and tenure on the job (along with main effects of each of these). None of these interactions added to the explanatory power of the equations. The impact of beauty spending on appearance in our data is basically independent of these women's other characteristics.
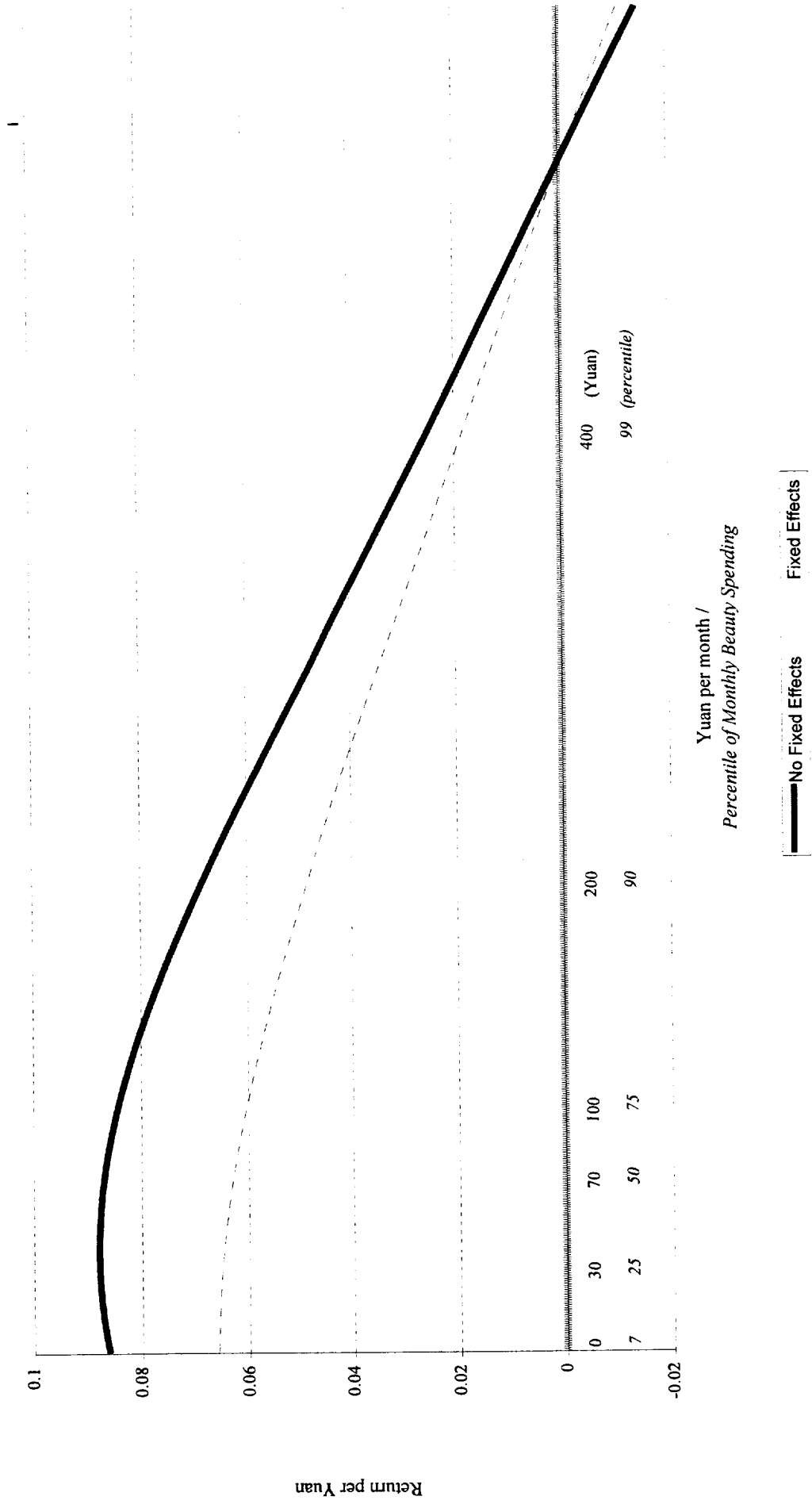
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Yet another concern is that differences in beauty among women in the sample are related not to spending on beauty items for themselves, but instead to their husbands' attractiveness as marriage partners. In that case we would be attributing differences in the productivity of women's beauty spending to what are in fact differences in their B_0. To examine this possibility we add measures of other family income (husband's earnings and unearned income) and husband's years of schooling to the equations in Table 4. While these latter two terms are significant in the beauty probits, they do not greatly reduce the coefficients on the terms in X_B. (For example, in the first equation in Table 4 the coefficients become 0.00217 and -0.00249 and remain statistically significant as a pair.) That beauty spending does alter perceived beauty, and that it does so at a diminishing marginal rate, seems fairly robust.

V. Calculating the Monetary Benefits of Beauty Spending

Answering the titular question of this study requires using the estimates presented in the previous section to simulate the impact on earnings of changes in spending on beauty items. The simulation calculates $\{[dW/dB][dB/dX_B]\}$, using the beauty parameters from the fourth and sixth regressions presented in Table 2 to estimate the first term in brackets, and the impacts of X_B from the probits in Table 4 to estimate the second term. The hourly earnings measures on which the regressions in Table 2 are based are multiplied by monthly hours to make W in these calculations comparable to X_B, which is measured in yuan/month.

Figure 1 presents the calculation of this bracketed term at each value of X_B over the entire range of beauty spending. The first key along the horizontal axis shows the amount of spending on beauty items per month, while the second key indicates where that spending lies in the distribution of X_B. The vertical axis shows the marginal impact on wages at each level of X_B, essentially

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Figure 1. Marginal Effect on Earnings of Beauty Spending

Return per Yuan

0	30	70	100	200		400	(Yuan)
7	25	50	75	90		99	(percentile)

Yuan per month /
Percentile of Monthly Beauty Spending

No Fixed Effects   Fixed Effects

showing the fraction of an additional yuan of spending on beauty that is paid back in the form of higher earnings. The darker curve is based on the probit estimates in Table 4 that exclude interviewer effects, while the dashed curve bases the simulation on the estimates that include interviewer fixed effects.

The simulations make it absolutely clear that even the very first yuan spent on beauty items generates only small payoffs in the form of higher wages, less than 10 percent of the extra amount spent. Because of the diminishing effect of beauty spending on appearance, the per-yuan payoff of additional spending beyond the mean is even smaller. Indeed, by the 95th percentile of beauty spending the marginal effect is only half its initial value. Primping clearly does pay; but the payoff is only a tiny fraction of what is spent. In terms of the equilibrium condition in (4), the results imply that $[dW/dB][dB/dX_B]$ is far below one. The simulations imply that the overwhelming majority of spending on beauty items is for consumption purposes.

One might object that there is another margin along which X_B might be viewed as an investment, namely as something that would improve the woman's match in the marriage market. This is not likely to be important in this sample: The estimates are based only on married women with a husband present; and, since divorce is much less prevalent (though increasing) in China than in most industrialized Western countries, precautionary investment in looks seems like an unimportant motive.[8] Additional evidence that this is not a relevant margin for these women is provided by reestimates of the equations presented in the bottom row of the second panel Table 2

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[8] In 1993 the crude divorce rate in China was 0.76 per 1000 people (U.N. Demographic Yearbook, 1996, p. 384), while in the same year in the United States it was 4.6 per 1000 people (Statistical Abstract of the United States, 1998, p. 111). The 1995 urban household income distribution survey, conducted by the Institute of Economics at the Chinese Academy of Social Sciences, indicated a divorce rate in urban China of less than one percent.

that distinguish the impacts of looks for women 40 and under, or over age 40.[9] Older women, who are less likely to be divorced and see a payoff in the marriage market for additional purchases of beauty items, see the same effect of above average looks on their earnings as do younger women. Only for the tiny fraction of women categorized as below average is there a difference in the payoff by age. We may infer that this other margin along which women might obtain a monetary payoff to their spending on looks is not important in this sample.

VI. Some Potential Biases

The estimates of $[dW/dB][dB/dX_B]$ will be biased if estimates of either of the two parameters on which they are based is biased. The estimated effect of spending on beauty, dB/dX_B, will be unbiased only if the impact is independent of workers' inherent beauty (if $B_{12} = 0$). However, only if the impact of beauty spending is higher for inherently worse-looking workers (if $B_{12} < 0$) will dB/dX_B be biased downward, thus biasing the product in (4) downward from one. Otherwise, our estimate of this product of parameters is unbiased or is biased upward toward one. The beauty production function that we have estimated includes several variables designed to proxy B_0. Only to the extent that unobserved variation in B_0 is negatively correlated with X_B would the estimate of dB/dX_B be biased downward.

Biases in the estimates of dW/dB depend on the extent of simultaneity between beauty and earnings -- on reverse causality from earnings to beauty. One might argue that women whose wages are higher due to unobservables that are subsumed in the error term in the wage equation spend more on beauty, so that our estimate of dW/dB is biased up. Also, it is possible that employers require

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[9] Interactions with an indicator variable for ages 40 and under were added to the earnings regressions. In the specification containing indicators of above-average and below-average looks, the interaction terms were 0.0045 (s.e. = 0.064) and 0.450 (s.e. = 0.285). The main effects of the beauty measures are 0.098 (s.e. = 0.049) and -0.472 (s.e. = 0.178).

workers in high-paying jobs to spend more on clothing/cosmetics. We made various attempts to find good instruments for beauty in our data to include in estimating the earnings equations, but none was satisfactory.[10] If the bias in this term were positive, it would imply that $[dW/dB][dB/dX_B]$ is overestimated, and the payoffs to X_B presented in Figure 1 would thus be upper bounds on the monetary returns to spending on beauty.

Numerous strands of extraneous information suggest that the bias in the estimate of dW/dB will not be large. Biddle and Hamermesh (1998) demonstrate on a sample with relatively little heterogeneity along other dimensions that beauty assessed when otherwise identical workers were in their early twenties has positive and significant impacts on their earnings around age 40. Also, if prior success enabled people to "buy beauty," we would expect bigger impacts of beauty on earnings, other things equal, among older workers (say ages 40 and over) who have had more time to use their prior earnings to enhance their beauty. As noted in the previous section, we find no significant difference in the estimated effect of good looks on wages between younger and older women, a result similar to that in Hamermesh and Biddle (1994). Taken together, this partly extraneous evidence suggests that reverse causation, from earnings to beauty, is not important, and thus that this potential source of bias to our estimate is probably small.

A final possibility is that beauty spending operates along the margin of labor-force entry by enhancing a woman's looks and enabling her to enter a labor market in which homely women have an incentive to stay home. For that margin to be important beauty would need to have a substantial impact on female participation. Hamermesh and Biddle (1994) found some small effect for U.S.

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[10] In addition to experimenting with specific variables as instruments for B, we also attempted to estimate a complete three-equation system involving the earnings and beauty equations and an equation describing X_B (following on a related approach of Zhang and Chan, 1999). In all cases the difficulty was with the coefficient on B in the earnings equation.

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women. In Shanghai women who are not full-time labor-force participants (those excluded from our sample) are less likely to be rated good-looking (25 percent of them compared to 35 percent of our sample). But in a probit that describes the probability of full-time employment by education, age, the presence of young children and an indicator of being good-looking, the last variable only raises this probability by 0.02 (t = 0.75). In a similar probit on female participation the effect is also 0.02 (t = 0.68). Expanding the sample in the beauty production function to include all women—nonparticipants, part-time workers and the full-time workers studied here – hardly alters the estimates presented in the first row of Table 4: The coefficients become 0.00332 and -0.00368. Considering the role of beauty spending on labor-force participation does not alter our conclusions.

While not a question of bias per se, one might wonder whether the results would be the same if we had similar data for a higher-wage society and labor market. Certainly the results from the earnings equations here and for the U.S. and Canada in Hamermesh and Biddle (1994) suggest that, if anything, dW/dB is larger for women in Shanghai than in North America. The beauty production function that we have estimated is unique. However, if this function were universal, one would expect that women in higher-income countries would have pushed further along the margin of X_B to the point where the impact of marginal spending on beauty items is even smaller than in our sample. If that were the case, coupled with the smaller wage effects of beauty it would suggest that the marginal impact of X_B on wages would be even lower in North America.

VII. Conclusion

In this study we have provided a link between spending on a partly mutable individual characteristic and the impact of that characteristic on the worker's labor-market success for one country (China) and for one type of spending (purchases of clothing and cosmetics). The results

make it quite clear that on average such spending is overwhelmingly for consumption, although it does have some slight earnings-enhancing effect, while the marginal amount spent has an even smaller effect on earnings. This conclusion arises mainly because the impact on beauty of even large changes in this type of spending is not huge. The results say nothing, directly or even indirectly, about the productivity of such potential long-term investments in beauty as plastic surgery, to which the monetary returns may differ from those to the beauty spending whose effects we examine here.

We view this analysis as typifying a general class of issues in labor and other markets, in which people spend on some item that may partly represent consumption but may partly too enhance the worker's productivity. Investment in education, for example, is an analogous two-step process, with worker-consumers choosing (perhaps collectively) how much to invest given some knowledge of the productivity-enhancing effects of the investment (of the educational production function -- Hanushek, 1996) and of the payoff of higher productivity in higher earnings. The role of spending on health-improving items, for example, in nutrition in developing countries (Strauss, 1998), is another instance where resources are devoted to generating a characteristic that in turn raises earnings. While the problem is thus quite general, it has typically not been analyzed empirically as the two-step structural problem that we outline here. Our example of the process by which spending is eventually translated into higher earnings should provide a model for similar analyses designed to infer how much of such spending is pure consumption and how much investment, and to indicate the true monetary rate of return on such investments.

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