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Dress for success—does primping pay?

Daniel S. Hamermesh [a], Xin Meng [b,*], Junsen Zhang [c]

[a] *Department of Economics, University of Texas, Austin, Texas, USA*
[b] *Division of Economics, Research School of Pacific and Asian Studies, Australian National University, Canberra, Australia*
[c] *Department of Economics, Chinese University of Hong Kong, Shatin, New Territories, Hongkong, China*

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Abstract

Combining labor-market information, appraisals of respondents' beauty, and household expenditures allows us to examine within a unified framework the relative magnitudes of investment and consumption components in one activity, women's spending on beauty-enhancing goods and services. We find that beauty raises women's earnings adjusted for a wide range of controls. Additional spending on clothing and cosmetics has a generally positive marginal impact on a woman's perceived beauty. The relative sizes of these effects demonstrate that such purchases pay back no more than 15% of additional unit of expenditure in the form of higher earnings. Most such spending seems to represent consumption. © 2002 Elsevier Science B.V. All rights reserved.

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1. The general problem

Recent research (Hamermesh and Biddle, 1994) demonstrates the impact of workers' looks on their earnings adjusted for a very wide variety of other characteristics. This effect exists within narrowly defined occupations, and beauty generates both static and dynamic impacts on occupational choice (Biddle and Hamermesh, 1998). 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

* Corresponding author.
E-mail address: Xin.Meng@anu.edu.au (X. Meng).

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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 *and* workers' efforts to improve their looks.

Fortunately the Institute of Population Studies of the Shanghai Academy of Social Sciences (SASS) undertook a survey of members of households in Shanghai, China, that provided information on their labor-market status, including their earnings; on their looks (based on interviewers' ratings); and, most important for our purposes, on each household's expenditures in a wide variety of categories, with wives' spending on clothing and cosmetics included as one category. These data enable us to study the extent to which (female) workers improve their economic status by spending that might enhance their appearance.

Beauty spending provides just 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 steps in the process—from spending to changes in the characteristic and then 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 other personal characteristics. While theoretical attention has been paid to the issue (Suen and Mo, 1994), and while Lazear (1977) attempted to extricate consumption from production motives in education indirectly, we believe that this study is the first to use direct information on individuals' spending, on what it produces, and on the effect of that production on earnings.

The next section introduces the new data set used here and presents some introductory estimates of single-equation models describing earnings and spending on beauty. Section 3 presents a theoretical motivation for the empirical work, one that focuses on what we might expect to be the impact on earnings of spending on appearance, while Section 4 specifies and estimates a complete model describing the joint determination of earnings, beauty and spending on beauty. Section 5 uses the results to infer the average and marginal impacts of such spending.

2. Data and preliminary estimates

The data used in this study come from a survey conducted early in 1996 in Shanghai, China, of a stratified multi-stage sample of 3000 individuals ages 15–64. 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% of the average household's total expenditures. Among the categories was "spending on wife's clothing and cosmetics," reported by the woman who did the spending. Expenditures in this category provide the information that we use to measure $\boldsymbol{X}_{\mathrm{B}}$, women's spending on beauty items.

At the end of the interview, the interviewer rated the respondent's appearance on a 5-point scale using the categories (translated from the Chinese): (1) Very pretty; (2) Pretty; (3) Average; (4) Below average; (5) Ugly. These ratings form the basis for our measure of

women's beauty. The survey also provides information on the respondent's self-reported health status (a 5-point scale ranging from very good to very bad) and on her height and weight. These latter allow 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.

In order to avoid heterogeneity in the composition of the sample we restrict the analysis to women who were Han Chinese; had a BMI $\geq$ 17 (following Fogel, 1998); worked at least 30 h/week; were wage and salary earners; resided permanently in Shanghai; were in the age range 22–60; and were not recent migrants to Shanghai. Since only 1% of the female workers who otherwise qualified for inclusion in the sample were unmarried, we further restricted the sample to married women with husband present, leaving a final sample of 853 women for use in estimation. Some of the restrictions, for example, to full-time workers, are relaxed later in tests of robustness of our estimates.

The upper panel of Table 1 presents the distributions of the appearance of the women in this sample. Compared to similarly constructed ratings in surveys conducted in North America (Hamermesh and Biddle, 1994), there is much less weight in the lower tail of the distribution of looks, and more workers are rated in the highest category. The paucity of observations at the extremes leads us to base the analysis of the determinants and effects of beauty on the threefold classification—good-looking (very pretty or pretty), roughly one-third of the sample, average, and below average.

Table 1 also presents statistics describing women's spending on beauty items and the total expenditure of the households that contain those women. While the mean monthly expenditure on beauty items is only 88 yuan, the variation across sample members is huge: Four percent of the respondents spend more than 200 yuan/month on these items, and the

Table 1
Female workers' appearance and spending on beauty items, Shanghai 1996 (N = 853)

Appearance category (percent distribution)	
Very pretty	6.33
Pretty	28.48
Average	64.01
Below average	1.06
Ugly	0.12
Expenditure on beauty items (yuan/month)	
Mean	88.27
Std. Dev.	92.09
Minimum	0
Maximum	1000
Total household expenditure (yuan/month)	
Mean	1406.90
Std. Dev.	528.59
Minimum	110
Maximum	7010

maximum is over 10 times the mean. This suggests that there is ample room for examining the possible effect of spending $\boldsymbol{X}_{\mathrm{B}}$ on beauty B. Finally, it is worth noting that in the average household spending on women's clothing and cosmetics accounts for 6.3% of total household expenditure. This percentage is quite high by Western standards, but differences in survey definitions make it credible.[1]

As a first cut at the data, we present estimates of the relationship between looks and earnings without controlling for other determinants of earnings. For purposes of this estimation looks are coded as an indicator variable, with above average looks equaling one, zero otherwise.[2] Earnings are measured by (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 in this sample.[3] It ignores issues of the potential endogeneity of beauty, but those are addressed at length in Section 4. The first row in Table 2 presents estimates of a simple regression of the logarithm of hourly earnings on the indicator of whether a woman's looks are rated above average. The estimates yield a fairly clear conclusion: Women in the above average groups earn significantly more than the nearly two-thirds of workers whose looks are considered average or below average.

The second row in Table 2 presents results from an equation that contains a wide variety of the usual controls, including years of formal education and a quadratic in age. A vector of indicators spanning the workers' responses about their health is included, as are measures of height and weight and indicators of the presence of a young child and whether the worker received formal on-the-job 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 that 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

[1] Lundberg et al. (1997) report expenditures on women's clothing as averaging 2.8% of total household *consumption* in the United Kingdom between 1973 and 1990. In the United States in 1994–1995, spending on women's clothing was 1.6% of total *expenditures* in married-couple households (U.S. Bureau of Labor Statistics, 1997). Our category $\boldsymbol{X}_{\mathrm{B}}$ is broader than women's clothing alone, so that the expenditure share here is not so outlandishly high as it might seem.

[2] As our primary interest is in the impact of "above-average looks" on earnings, in the single-equation estimates only a two-category variable indicating above-average looks is included. In the next section, when the three-equation system is estimated the prediction of above-average looks is obtained from an ordered probit model that uses the three-category variable indicating looks (above-average, average, and below-average) as the dependent variable.

[3] All the regressions were re-estimated using the logarithm of monthly earnings as the dependent variable, and including weekly hours as an independent variable. The changes in the coefficients of the beauty measure from those presented in Table 2 were minuscule.

Table 2
Estimated effects of beauty on log(hourly earnings) and of beauty spending on beauty ($N = 853$)[a]

	Estimated effects		Adjusted or pseudo-R^2
Earnings equation	Beauty		
No controls	0.1410 (0.0335)		0.0212
With controls	0.1043 (0.0324)		0.164
Beauty equation	Spending	Spending^2	
No controls	0.1373 (0.0542)		0.008
	0.3307 (0.0818)	− 0.0004 (0.0001)	0.014
Controls and interviewer indicators	0.0903 (0.0584)		0.313
	0.1983 (0.1061)	− 0.00020 (0.00013)	0.315

[a] Here and in Table 3, the numbers in parentheses are standard errors. The earnings 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 age, the height and the weight; 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. The ordered probits here and in Table 3 that include controls also contain: A quadratic in age, continuous measures of height and weight, the numbers of male and of female children ever born, indicators of self-reported health, and interviewer fixed effects.

variance, suggesting that wage-setting in Shanghai has fewer deterministic components than that in industrialized labor markets.

The estimated effects of appearance on earnings change remarkably little once we adjust for this large vector of other determinants of earnings. Good-looking women, those in the top 35% of women arrayed by appearance, earn roughly 10% more than the large majority of women whose looks are considered average or below. The impact is significantly positive. It is also somewhat larger than that found by Hamermesh and Biddle (1994) for similar specifications using North American data. This difference is very hard to explain, other than by cultural differences between North America and a less-developed economy.

In order to infer whether and to what extent beauty spending pays off in the labor market we need to estimate an equation relating the outcome—the woman's looks—to both her spending on these items and to controls that might determine her "baseline beauty," B^*. The bottom part of Table 2 presents estimates of parameters from an ordered probit model relating the three-category "looks" variable to beauty spending, first included linearly and then as a quadratic. The coefficients in the first two rows suggest that, if we abstract from the determinants of B^*, additional spending has a positive and significant impact on the woman's looks, one that, moreover, diminishes as the amount spent rises.

Beauty spending may be correlated with the demographic characteristics that determine B^*. Accordingly, the final pair of estimates in Table 2 is based on equations that also 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, measures of her height and weight, and the numbers of children of each sex to whom she has given birth. The underlying survey was conducted by 60 interviewers, each of whom completed interviews of approximately 50 adults. It is quite possible that some interviewers' ratings of the women's beauty were generous while others' were harsh. If the relative generosity of the

ratings were correlated with the other determinants of baseline beauty and with beauty spending, failure to account for the interviewers' identity would bias the estimated impact of beauty spending on beauty. The equation thus also includes interviewer fixed effects.

The coefficients from these expanded specifications suggest that some of the apparent impact of beauty spending on beauty shown in the first two sets of estimates may have resulted from the correlation of such spending with the determinants of B^*. While none of the parameter estimates on beauty spending is statistically significant at the conventional 5% level, once we account for the determinants of B^*, each coefficient remains larger than its standard error. The results suggest a positive but decreasing marginal effect of beauty spending on appearance. The peak of the total impact of spending is at 495 yuan/month, so that the marginal effect of beauty spending is negative for only 8 of the 853 women in the sample.

3. A simple model of wages, beauty and beauty expenditures

These results are interesting, but they ignore the likelihood that a rational woman's spending on beauty will not arise independently of her recognition of the likely impact of her beauty on her earnings, and its obverse, that a woman who earns more or is married to a man with higher income is likely to spend more on beauty-enhancing products and services. These considerations suggest that we need to specify the woman's decision process and examine its implications for the specification of an estimable model describing these outcomes. 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 and of which women are aware when they invest in their beauty.[4]

To elucidate the simultaneous nature of the woman's decision problem, let B be her beauty capital and X be the vector of all non-beauty goods purchased. The female worker maximizes the utility function

$$U(\boldsymbol{X},B) \tag{1}$$

where $U_B > 0$, $U_{BB} < 0$. (One might expand Eq. (1) to include the beauty of other people with whom she comes into contact, from co-workers to friends to shopkeepers, but that expansion would not alter the positive implications of this derivation.) The maximization is subject to:

$$\boldsymbol{X}_B + \sum p_i \boldsymbol{X}_i = W(B), \tag{2}$$

where the price of beauty items is normalized to 1, $\boldsymbol{X}_i$ and p_i indicate the quantity and price of the ith non-beauty goods purchased, and W is her wage, a function of her beauty, among other things. All 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 goods

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

consumption in the vector $\boldsymbol{X}$ is defined over a time period commensurate with definition of work time. We assume that B is a function of spending on beauty items and of B^*:

$$B = B(\boldsymbol{X}_B, B^*), \tag{3}$$

with B_1 and $B_2 > 0$, and $B_{11} < 0$. As with most other earnings-augmenting activities, we assume diminishing returns to additional spending in this beauty production function. The sign of B_{12} is ambiguous: Whether the gains to spending on beauty items are greater or smaller for people who are inherently better looking is unclear a priori. In this model $\boldsymbol{X}_B$ is both an investment that enhances a woman's earnings and a consumption item that yields utility. This is because such spending pays off in other markets (see Hamermesh and Biddle, 1994, for evidence from the marriage market) and may even partly be pure consumption.

The worker will choose $\boldsymbol{X}_B$ to satisfy:

$$U_B \mathrm{d}B/\mathrm{d}\boldsymbol{X}_B + \lambda\{[\mathrm{d}W/\mathrm{d}B][\mathrm{d}B/\mathrm{d}X_B] - 1\} = 0, \tag{4}$$

where λ is the Lagrangian multiplier in the worker's budget constraint. 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 spending 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 even when the marginal effect is less than that.

The empirical analysis in this study focuses on the product in the bracketed {} term in Eq. (4). We examine whether 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?

4. Specification and estimation of the behavioral model

The behavior derived in the previous section suggests that the worker chooses beauty spending as part of her optimization subject to the constraints of her spending, her beauty production function and the wage function. She can be viewed as knowing the determinants of her earnings (a market earnings function) and of her beauty (through the beauty production function), and choosing her beauty spending to maximize her utility. The theoretical model implies that beauty spending may enhance beauty, which in turn may raise wages. The model also implies that beauty spending is endogenous, in that it is affected by wages. Hence, it is necessary to specify a simultaneous-equation model that allows for this behavioral relationship between wages and beauty spending. This view yields a three-equation model:

$$W = \alpha_1 B + \boldsymbol{\beta}_1 \boldsymbol{X}_1 + \varepsilon_1 \tag{5a}$$

$$\boldsymbol{X}_B = \alpha_2 W + \boldsymbol{\beta}_2 \boldsymbol{X}_2 + \varepsilon_2 \tag{5b}$$

$$Pr\{B = j\} = Pr\{\alpha_{31}\boldsymbol{X}_B + \boldsymbol{\beta}_3\boldsymbol{X}_3 + \varepsilon_3 > 0\}, \quad j = 1, 2, 3 \tag{5c}$$

where $\boldsymbol{X}_1$, $\boldsymbol{X}_2$ and $\boldsymbol{X}_3$ are exogenous determinants of W, $\boldsymbol{X}_\mathrm{B}$ and B^*. The α_i and the vectors $\boldsymbol{\beta}_i$ are parameters to be estimated, and the ε_i are error terms, of which only the error in Eq. (5c) needs to be assumed normal.

To estimate these equation systems we include in vectors $\boldsymbol{X}_1$ and $\boldsymbol{X}_3$ the same sets of exogenous variables included in the preliminary equations whose results were presented in Table 2, including in $\boldsymbol{X}_3$ the vector of interviewer fixed effects. The vector $\boldsymbol{X}_2$ contains a quadratic in the household's total expenditures, a measure of the household's permanent income. It also contains a vector of variables that might affect the wife's preferences for spending on beauty items, including the number of years she has been married to her current husband (with an expected negative effect on beauty spending) and an indicator if she states that she does a lot of housework (also with an expected negative effect on beauty spending).

The Eqs. (5a), (5b), (5c) is overidentified, with identification of Eq. (5c) achieved mainly by the exclusion of the woman's human capital and industry/occupational attachment. The identification of Eq. (5a) arises chiefly from the exclusion of the interviewer indicators and of total household expenditure, while Eq. (5b) is identified by measures of human capital, the interviewer indicators and the woman's health and nutritional characteristics.

We conducted both overidentification tests and F-tests to investigate the strength of the instruments in each equation.[5] For each overidentification test of the three equations, the χ^2 statistic is close to zero. The F-statistics for the earnings, beauty spending, and appearance equations, respectively, are 4.25, 75.21, and 166.65, which are all below the critical values. These tests indicate that our instruments are strong.

The Eqs. (5a), (5b), (5c) is estimated by a two-stage estimator that replaces the right-hand-side endogenous variables with instruments based on all the exogenous variables in the system. In the first stage, Eq. (5a) is estimated using OLS. Due to the censored nature of the dependent variable (around 15% of our sample has zero expenditure on beauty), Eq. (5b) is estimated as a tobit model. Eq. (5c) is estimated as ordered probit model.[6] The predicted values/probabilities are then used to replace the three endogenous variables in the system for the second-stage estimation. The standard errors of the second-stage parameter estimates are bootstrapped from the existing sample using the results of 500 random replications.[7]

[5] The overidentification test is conducted by generating the predicted error terms from the estimation of Eqs. (5a), (5b), (5c) (with all three equations estimated using OLS) and then regressing these error terms on all the exogenous variables in the system. This generates chi-square statistics $\chi^2 = R^2N$. The F-tests are conducted by estimating restricted equations excluding one or a group of instruments at a time and then calculating the average F-statistics.

[6] The categories of the dependent variable in the ordered probit model are: above-average, average, and below-average looking. The system was also estimated using a binary classification of beauty as the dependent variable in a simple probit model, with results similar to those presented here.

[7] An alternative procedure that also yields consistent estimates of the standard errors is offered by Zhang and Chan (1999). We use bootstrapped estimates for convenience and in recognition that their small-sample properties may be as good or better than those of analytic standard errors.

Table 3
Two-stage estimates of the system describing earnings, beauty expenditures, and appearance, Eqs. (5a), (5b) and (5c), Shanghai 1996 ($N = 853$)

Dependent variable equation	log(earnings) (Eq. (5a))	Beauty spending (Eq. (5b))	Appearance (Eq. 5(c))
Effect of			
Appearance	0.179 (0.056)		
log(earnings)		36.625 (16.831)	
Beauty spending			0.289 (0.153)
Adjusted or pseudo-R^2	0.164	0.024	0.317

The estimates of the coefficients on the right-hand-side endogenous variables in Eqs. (5a), (5b), (5c) are presented in Table 3.[8] The most important thing to note here is that accounting for simultaneity among beauty spending, beauty and earnings does not *qualitatively* change the conclusion about the impact of beauty on working women's earnings in the linear system. The estimated impact of above-average looks on earnings, as compared to having average or below-average looks, is 17%, which is much larger than the single equation estimate (10%). The effect of beauty on earnings is not the result of a feedback of earnings onto beauty that is mediated through spending that might improve beauty. The estimates of Eq. (5b) suggest that women with higher earnings do spend more on beauty items, even holding constant their household's total expenditure.[9] The elasticity of beauty spending with respect to the woman's earnings is 0.41. Other estimates (not presented in the table) suggest that beauty spending is significantly quadratic in total household expenditures (holding the wife's earnings constant). More recently married women spend significantly more on beauty items, all else equal, and among these full-time workers those who report doing more housework spend less on beauty items, as we expected.

The absolute impact of beauty spending on looks is larger when we account for simultaneity than in the estimates in Table 2 that treated beauty spending as exogenous. The $\boldsymbol{X}_B$ in Eq. (5c) has a t-statistic of 1.90, which is statistically significant at the 5% level of significance. We can use the estimates of α_{31} to infer the extent to which women in this sample are able to spend on beauty items to improve upon their baseline beauty B^*. A woman who spends nothing on beauty has a predicted probability of 0.310 of being viewed as good-looking, so that we might take that fraction as indicating B^*. Moving from $\boldsymbol{X}_B = 0$ to the mean of $\boldsymbol{X}_B$ raises the predicted probability of being good-looking to 0.348.

[8] We also estimated a nonlinear system that includes a term $\boldsymbol{X}_B^2$ in Eq. (5c). A standard approach to two-stage estimation of a nonlinear system is to include all linear, quadratic and interaction terms in the first stage (Greene, 1993, pp. 609–610). However, this approach will not work given the small number of observations and the numerous interviewer dummies and other explanatory variables in our model. Instead, we compromise between what is impossible and ignoring the problem by including in the first stage linear and quadratic terms of all the exogenous variables. The results differ little from those obtained from the linear estimation. A complete set of results for both linear and non-linear estimations is available upon request from the authors.

[9] Eqs. (5b) and (5c) are also estimated using log($\boldsymbol{X}_B$) and the logarithms of expenditure and its squared term. This respecification does not change the results qualitatively except that the effect of log ($\boldsymbol{X}_B$) on beauty in Eq. (5c) becomes statistically insignificant with t-ratio of 1.02.

Doubling spending on beauty to twice the sample average (spending 176 yuan) raises the chance of being viewed as good-looking to only 0.434. Beauty spending is productive of additional beauty, but its marginal product is not very high.

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 $\boldsymbol{X}_B$. 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 Eq. (5c) successive interactions of $\boldsymbol{X}_B$ with such measures as years of schooling, age, and years since marriage (along with main effects of each of these). None of these interactions added to the explanatory power of the equations or changed our inferences about the impact of $\boldsymbol{X}_B$ on beauty. The impact of beauty spending on appearance in our data is basically independent of these women's other characteristics.

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 differences in their B^*. To examine this possibility we add measures of other family income (husband's earnings and unearned income) and husband's years of schooling to Eq. (5c). These latter two terms are insignificant in the beauty equation, and they do not greatly reduce the coefficients on the terms in $\boldsymbol{X}_B$: The estimate of α_{31} in the single-equation estimation becomes 0.087. The finding that beauty spending alters perceived beauty is fairly robust.

5. 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 relation between changes in beauty spending and changes in earnings. The simulations calculate $[\mathrm{d}W/\mathrm{d}B][\mathrm{d}B/\mathrm{d}\boldsymbol{X}_B]$. The coefficients α_1 and α_{31} from the linear two-stage estimates of Eqs. (5a), (5b), (5c) are used. The log(hourly earnings) measure on which the estimates in Table 3 is based are exponentiated and multiplied by monthly hours to make W in these calculations comparable to $\boldsymbol{X}_B$, which is measured in yuan/month. As our derivation showed, all three differentials in the bracketed {} term in Eq. (4), $\mathrm{d}W$, $\mathrm{d}B$ and $\mathrm{d}\boldsymbol{X}_B$, are jointly determined. Implicitly we are measuring the relationship among these three when the system that determines them is shocked by a change in one or more of the exogenous variables.

Fig. 1 presents the calculation of this bracketed term at each value of $\boldsymbol{X}_B$ over the entire range of beauty spending. The horizontal axis shows the amount of spending on beauty items per month. The vertical axis shows the relationship between changes in wages and changes in $\boldsymbol{X}_B$ at each level of $\boldsymbol{X}_B$, essentially showing the fraction of an additional yuan of spending on beauty that is paid back in the form of higher earnings.[10]

[10] The percentile distribution of the spending is shown on the top horizontal axis of the figure.

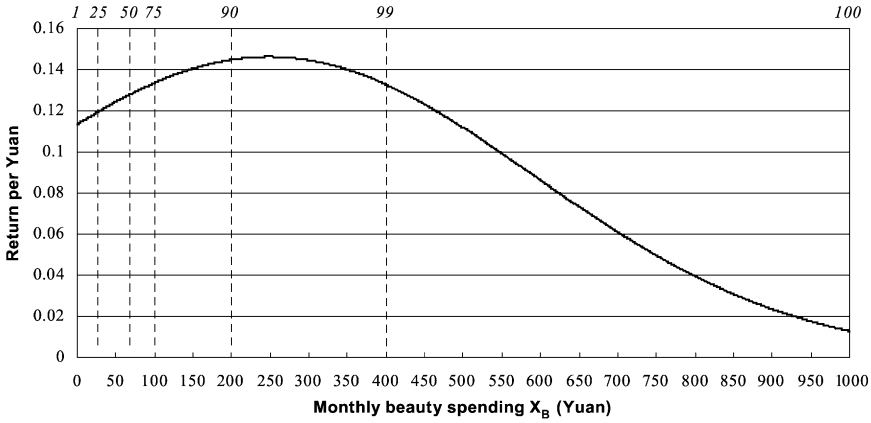

Fig. 1. Marginal relation between beauty spending and earnings.

The result shows that the marginal effect of beauty spending on monthly earnings is non-linear. At the initial stage of beauty spending (the bottom half of the distribution of the beauty spending), every additional yuan spent on beauty items increases monthly income by 11–12.8 cents. At the mean level of spending (88 yuan), each additional yuan spend on beauty increases earnings by 13 cents. At the 90th percentile (200 yuan), the marginal effect on earnings is 14.5 cents, while at the maximum level of spending the marginal effect is reduced to 1.3 cents. The simulations make it absolutely clear that spending on beauty items generates only a small payoff in the form of higher wages. Primping clearly does pay; but the payoff is only a small fraction of what is spent. In terms of the equilibrium condition in Eq. (4), the results imply that $[\mathrm{d}W/\mathrm{d}B][\mathrm{d}B/\mathrm{d}\boldsymbol{X}_B]$ is far below one. The simulations imply that the overwhelming majority of spending on beauty items is for consumption purposes or represents investments that pay off outside the labor market.

Beauty spending $\boldsymbol{X}_B$ might also be viewed as an investment along the margin of improving the woman's match in the marriage market. This is not likely to be important in this sample: The estimates of our model 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.[11] Additional evidence that this is not a relevant margin for these women is provided by re-estimates of the Eqs. (5a), (5b), (5c) that re-specify Eq. (5a) to distinguish the impacts of looks for women 40 and under, or over age 40.[12] Older women, who are less likely to be divorced and obtain a payoff in the marriage market for additional purchases of beauty items, actually see a larger effect of above-average looks on their

[11] 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 survey of urban household incomes conducted by the Institute of Economics at the Chinese Academy of Social Sciences indicated a divorce rate in urban China of less than 1%.

[12] An interaction of predicted beauty with an indicator variable for age greater than 40 and the predicted beauty variable itself were added to Eq. (5a) and the second-stage estimates were re-estimated. The coefficient on the predicted B was 0.142 (S.E. = 0.065), while the estimated interaction term was 0.082 (S.E. = 0.08).

earnings than do younger women. We may infer that this other margin along which women might obtain a monetary payoff to spending on looks is not important in this sample.

Another possibility is that beauty spending operates along the margin of labor-force entry by enhancing a woman's looks and enabling her to overcome homely women's incentives to stay home. For that margin to be important beauty would need to have a substantial impact on female participation. In Shanghai women who are not full-time[13] labor-force participants (those excluded from our sample) are less likely to be rated good-looking (25% of them compared to 35% of our sample). But in a probit that describes the probability of full-time employment by education, age, the presence of young children and the indicator of good looks, beauty only raises this probability by 0.02 ($t = 0.75$). In a similar probit on female participation, the effect is also 0.02 ($t = 0.68$).

While not a question of statistical bias, one might wonder how the results would change if we had similar data for a higher-wage society and labor market. A comparison to estimates of earnings equations for the U.S. and Canada in Hamermesh and Biddle (1994) suggests 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 even further along the margin of $\boldsymbol{X}_B$ in Eq. (5c) to the point where the impact of marginal spending on beauty items has become even smaller than that in our sample. If that were the case, coupled with the smaller wage effects of beauty it would suggest that the marginal impact of $\boldsymbol{X}_B$ on wages would be tiny in North America.

6. Conclusion

This study provides a direct 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 (women's 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 small earnings-enhancing effect. 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 potential long-term investments in beauty, for example, plastic surgery, to which the monetary returns may differ from those to the beauty spending whose effects we examine here.[14]

[13] "Full time" is defined as working 30 h or more a week.

[14] The "Egg Auction" of models' ova promoted in October 1999 on the Web site http://www.ronsangels.com/ advertised, "Any gift such as beauty, intelligence, or social skills will help your children in their quest for happiness and success." Even if a purchased ovum were to guarantee a baby in the top third of beauty as compared to the average, and assuming a 10% earnings advantage to beauty and average annual earnings of \$30 000, the present value at $r = 0.05$ of the extra earnings generated by this investment is only \$20,000. This compares to starting prices in the auction of up to \$150 000. This calculation suggests that the monetary return to spending on this (intergenerational) beauty-enhancing activity is also remarkably close to our estimate of $[dW/dB][dB/d\boldsymbol{X}_B]$ at the mean and indicates that this much different form of spending on beauty is also chiefly consumption.

This analysis typifies a general class of issues in which a household's spending both represents consumption and produces an increase in some productivity-enhancing characteristic. That in turn generates additional earnings for the worker–consumer. While this view is not new, our approach shows how it is possible to analyze consumption and investment motives directly within a single appropriate set of data. Spending on 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. Spending on health-improving items, for example, on nutrition in developing countries (Strauss, 1998), is another instance where resources are devoted to generating a characteristic that in turn raises earnings. Our direct approach to modeling and measuring the process by which spending is eventually translated into higher earnings should provide an example 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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