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It Pays to Be Happy (If You are a Man): Subjective Wellbeing and the Gender Wage Gap in Urban China

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Abstract

In this study we examine whether subjective wellbeing contributes toward a better understanding of the reasons for the gender wage gap. We explore whether the Personal Wellbeing Index, which is a psychometrically valid measure of subjective wellbeing, can explain differences in income between males and females. A feature of the study is that we employ a novel identification strategy proposed by Lewbel (2012), which utilizes a heteroscedastic covariance restriction to construct an internal instrumental variable (IV), to address the endogeneity of subjective wellbeing and years of schooling. Using a sample from urban China, we find that the relationship between subjective wellbeing and wages is stronger for males than females. In the ordinary least squares (OLS) results, the returns to subjective wellbeing are higher for males than females and in the IV estimates the coefficient on subjective wellbeing is significant (and large) for males, but is insignificant for females. We find that 0.2 per cent of the observed gender wage gap can be attributed to differences in mean subjective wellbeing in favor of females, while 53.5 per cent can be ascribed to gender differences in returns to subjective wellbeing in favor of males. We also find evidence that the relationship between subjective wellbeing and income is non-linear and that income peaks at higher levels of subjective wellbeing for men than women.

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Introduction

A large literature examines the economic returns to human capital. However, there are relatively few studies that have examined the economic returns to psychological capital. Among existing studies, most have examined the role of personality traits in influencing earnings (Goldsmith *et al.* 1997; Heckman *et al.* 2006; Nyhus & Pons 2005). A subset of these studies have explored the role of personality traits in contributing to the gender wage gap (Groves, 2005; Mueller & Plug 2006; Nyhus & Pons 2012; Semykina & Linz, 2007). Subjective wellbeing also represents important psychological capital which potentially influences earnings. There are a multitude of studies in organizational psychology that have tested the happy-productive worker hypothesis – the notion that individuals who report having higher subjective wellbeing are more productive at work (see Cropanzano & Wright, 2001; Wright & Cropanzano, 2007 for reviews). While findings have been mixed, Landy (1985) dubs the happy-productive worker thesis the 'holy grail' of organizational psychology.

However, there are only a limited number of studies which examine whether those who report having higher subjective wellbeing earn more (Diener *et al.* 2002; Graham *et al.* 2004; Marks & Fleming 1999; Mohanty 2009a 2009b Mohanty & Ullah 2012a). This issue, nevertheless, represents a natural extension of the happy-productive worker hypothesis if individuals are paid their marginal product of labor. Among those studies which have tested whether higher subjective wellbeing leads to higher wages, most employ longitudinal data in which it is examined whether subjective wellbeing in time period *t* is related to income in time period *t+n* (see eg. Diener *et al.* 2002; Graham *et al* 2004; Marks & Fleming 1999).

The purpose of this study is to use cross-sectional data collected from six cities in China to examine the relationship between subjective wellbeing and male and female earnings and also to consider the contribution of differences in subjective wellbeing to explaining the gender wage gap. Despite the Communist rhetoric that 'women hold up half the sky', there is considerable evidence of a growing gender wage gap in urban China. Moreover, existing studies suggest that a significant portion of the wage gap cannot be explained by differences in human capital and other observed characteristics (see eg. Gustafsson & Li, 2000; Zhang *et al.*, 2007; Liu, 2009). We hypothesize that a portion of the unexplained differential may be explained if subjective wellbeing is included in the Mincer (1974) earnings equation.

The paper extends the existing literature in three important ways. First, we use a novel identification strategy, proposed by Lewbel (2012), which utilizes a heteroscedastic covariance restriction to construct an internal instrumental variable (IV) to identify a causal relationship between subjective wellbeing and wages with cross-sectional data. The main problem in identifying a causal relationship is that subjective wellbeing is endogenous because it is likely to be both a cause and consequence of labor market outcomes. Bao and Lyubomirsky (2012) are typical when they state (at p. 4): "Cross-sectional studies allow us to observe whether an association exists between two variables (eg. happiness and [income]), but cannot tell us the direction of the relationship (eg. whether happiness leads to [income] or [income] leads to happiness). Thus, from these studies, we can determine that happiness is related to success, but we do not know if happiness causes success or if success causes happiness". A lack of conventional IVs has traditionally made it impossible to identify the causal relationship. The Lewbel (2012) strategy has the advantage that it can be used where other sources of identification, such as external IVs, are not available.

In estimating a Mincer (1974) earnings function, education is also endogenous. There are more conventional IVs for education (eg. father's education, mother's education, spouse's education) than subjective wellbeing, but they are often of doubtful validity. Family background variables, including parents' education, potentially have a direct effect on the individual's income level. For example, it can be argued that family background variables are correlated with family wealth, which then may have a direct influence on the income of their children. It may also be argued that family background variables are correlated with preference to find a job in a particular firm or industry, which then may have a direct influence on the individual's income. Assortative mating has been used to justify spouse's education as an IV (Pencavel, 1998). However, assortative mating also implies that spouse's education is likely to be highly correlated with family background variables and not really exogenous (Kang & Peng, 2012). Invalid IVs are correlated with the error term and can produce results worse than ordinary least squares (OLS) (Hahn & Hausman, 2003). A small number of recent studies that have used the Lewbel (2012) procedure in other contexts find that it produces estimates that are more plausible than IV results that rely on external instruments of questionable validity (see eg. Sabia 2007a, 2007b; Denny & Oppedisano, 2010; Belfield & Kelly, 2010; Kelly et al. 2011).[1]

The second contribution is that we arguably use a better measure for subjective wellbeing than those that have been employed thus far to study the relationship between subjective wellbeing and earnings. Most existing studies, which are in the economics literature, have used a single item indicator of life satisfaction (Graham *et al* 2004; Marks & Fleming 1999) or a binary variable denoting if the individual is

[1] These studies are based on the working paper version of Lewbel (2012).

'happy' or not (Mohanty 2009a, 2009b; Mohanty & Ullah, 2012a). In employing single-item indicators it is common for economists to justify such an approach on the ground that psychologists have shown responses to such a question to be a good indicator of subjective wellbeing (see eg. Graham *et al.*, 2004).

However, in the psychology literature on subjective wellbeing, where multi-item indicators are almost universally used, the use of a single item indicator has been widely criticized on two grounds. The first is that the researcher cannot estimate the internal consistency of a single item indicator, with the result being that such indicators are subject to low levels of internal reliability (see Pollard, 1996; Wanous *et al.*, 1997; Oshagbemi, 1999). The second is that single item indicators are not able to capture the multidimensionality of psychological constructs and hence construct validity is compromised. The advantage of using a multi-item measure that captures the potential multidimensionality of subjective wellbeing is that respondents may be satisfied with some aspects of their lives, but dissatisfied with others and hence a multi-item instrument is able to measure life satisfaction across these different domains. Multi-item indicators are more reliable than single item indicators because multi-item indicators are the sum of multiple items, hence they benefit from error reduction through aggregation (Kahneman *et al.*, 2006; Krueger & Schkade, 2007).

To measure subjective wellbeing we use the personal well-being index (PWI) (International Wellbeing Group, 2006), which is a scale that probes respondents' level of life satisfaction along seven domains. The PWI is now being used by psychologists in over 50 countries (International Wellbeing Group, 2006). In addition to being validated in several western samples, the PWI has been validated in China. Previous use of the PWI in China by psychologists has shown it to be a culturally appropriate

instrument – it has good validity and reliability and demonstrates similar psychometric properties among both Chinese and western samples. Davey and Rato (2012) present a review of recent psychometric studies for the PWI in China.

Zalenski *et al.* (2008) have argued that one reason for mixed findings in the literature on the happy-productive worker hypothesis is that studies confound state and trait measures of wellbeing. While trait effects measure wellbeing in the long run, state effects are short-run or transitory phenomena. Zalenski *et al.* (2008) argued that it is important to disentangle state and trait levels of analysis, since each leads to a fundamentally different question about the relationship between 'happiness' and productivity. Typically, what we are really interested in is trait level of analysis because what matters are productivity effects in the long run, rather than transitory shifts in productivity. The PWI is a trait measure of subjective wellbeing because it has been shown to be stable over time in numerous populations (Cummins, 1998; International Wellbeing Group, 2006). Thus, a major advantage of employing the PWI is that it can potentially predict long-run productivity (and income) even if happiness states were unrelated to short-term productivity because positive emotions build human capital that can be utilized in the long term (Fredrickson, 2001).

The third contribution is that we examine the role of differences in subjective wellbeing in explaining the gender wage gap. Following Blinder (1973) and Oaxaca (1973), the gender wage gap can be decomposed into two parts: one explained by economic characteristics and the other a residual. The residual, or unexplained portion of the gender wage gap, remains large (Nyhus & Pons, 2012). While the residual could reflect labor market discrimination, it could also reflect unobservable attributes that are manifested in labor market outcomes. We explicitly allow for

gender differences, both in endowments of subjective wellbeing and in the corresponding labor market premia/penalties. This allows us to examine to what extent gender differences in income is due to differences in endowments of subjective wellbeing as opposed to differences in the estimated returns to subjective wellbeing.

Subjective Wellbeing and Income

Underpinning an expected positive relationship between subjective wellbeing and income is the happy-productive worker thesis. The line of reasoning is that individuals who have higher levels of subjective wellbeing are more productive and more productive workers receive higher levels of income. The organizational psychology literature generally suggests a curvilinear relationship between subjective wellbeing and productivity in which there are diminishing returns to subjective wellbeing (see eg. studies reviewed in Fisher, 2003). The implication is that at high levels of subjective wellbeing, productivity will peak and thereafter fall.

There are several avenues through which individuals who report having higher subjective wellbeing will potentially be more productive (see Bao & Lyubomirsky, 2012; Boehm & Lyubomirsky 2008; Lyubomirsky *et al.*, 2005). First, people who have higher subjective wellbeing experience positive emotions and positive emotions are associated with approach-oriented behavior. Second, experiencing positive emotions broadens people's 'thought action repertoires' (Fredrickson, 2001), prompting them to generate new ideas and build human capital and psychological capital. Third, positive emotions have been found to enhance displays of helping behavior in the workplace and to engender reciprocity (Tsai *et al.*, 2007). Support from coworkers and supervisors makes it easier to perform specified tasks and enhances productivity. Fourth, people who have high subjective wellbeing are in a safe environment, which is well suited to 'broaden and build' human capital and

psychological capital, which is conducive to enhanced productivity (Frederickson, 2001). Mohanty and Ullah (2012b) found that growing up in a 'happier' family results in more schooling, which translates into higher earnings later in life.

We expect the relationship between subjective wellbeing and productivity to be stronger for males than females. If the relationship between productivity and subjective wellbeing is curvilinear, we posit that the curve would be higher for males than females as shown in Figure 1. This is because subjective wellbeing differs across its domains according to gender. While females are more focused on personal relationships and the non-work domain, males are more career-oriented and derive more satisfaction at work. Several studies suggest a higher correlation between job satisfaction and life satisfaction for males than females (see Erdogan *et al.,* 2012). The domains of subjective wellbeing map differently into productivity. Career and job concerns play a considerable role in workers' effort decisions (Gibbons & Murphy, 1992). Individuals who are more career-oriented have stronger incentives to put in effort, which affects productivity and income (Fama 1980; Holmstrom, 1982). Perhaps reflecting their career focus, findings from lab and field experiments suggest that, holding ability constant, males are more competitive than females in the workplace (Gneezy *et al.,* 2003; Flory *et al.,* 2010; Niederle & Vesterlund, 2007). Moreover, males are stronger negotiators over wages. Studies suggest that females are significantly less likely to engage in salary negotiations and to settle for lower compensation (Babcock & Laschever, 2003; Babcock *et al.,* 2006; Small *et al.,* 2007).

This discussion suggests the following two hypotheses that we test below:

H1: There is a positive relationship between subjective wellbeing and income.

H2: There are diminishing returns to subjective wellbeing.

H3: There is a stronger relationship between subjective wellbeing and income for males than females.

Insert Fig. 1

Data and Sample

A written survey containing the Chinese (Mandarin) version of the PWI, which can be downloaded from the web,[2] and questions on the personal characteristics of respondents was administered to individuals with an urban *hukou* (household registration) working in a variety of blue collar and white collar jobs across a range of sectors including government, heavy and light manufacturing, mining and services in six Chinese cities: Chengdu, Dalian, Fushun, Fuxin, Fuzhou and Wuhan. The survey was administered by Chinese academics in each city working with the second author in 2007. The objective was to get a representative sample in terms of age, gender, income, marital status and industry in which the respondent worked for each of the cities. The survey was administered by the Chinese academics in a range of locations, including shopping centers, train stations and workplaces, across urban districts in each of the cities. In each case the interviewer sat down and went through the questionnaire with the respondent. If the respondent refused to answer that person was replaced with another person with the broad objective of getting a representative sample in terms of age, gender, income, marital status and industry distribution. Altogether, 3390 surveys were completed, consisting of 500 in Chengdu, 558 in Dalian, 515 in Fushun, 498 in Fuxin, 500 in Fuzhou and 819 in Wuhan.

[2] http://acqol.deakin.edu.au/inter_wellbeing/index.htm

The personal characteristics of the respondents in the sample broken down according to city are given in Table 1. Table 1 also contains comparative information on the average monthly income in the respondent's city, average monthly income in the respondent's province and average monthly income in the region (coastal, central, south-west and north-east) in which the respondent lives. This information indicates that the average income of respondents is fairly representative of those living in urban areas at these various levels of aggregation. The descriptive statistics for the sample are reported in Table 2. Overall, there were 2868 valid surveys; of which, 1356 (47.2 per cent) were for males and 1512 (52.8 per cent) were for females. A limitation of the survey is that we do not have information on number of hours each respondent works per week. Hence, we define income as average monthly income.

Insert Tables 1 & 2

The six cities are quite diverse so we cannot say that all the respondents are representative of the urban population in China as a whole, although Chengdu, Wuhan and Fuzhou are representative of the western, central and coastal regions of China and Dalian, Fushun and Fuxin are three major cities in China's north-east.

The sample is generally representative of urban employees in China. Based on State Statistical Bureau data, in 2007 49.9 per cent of urban Chinese were male, 73.8 per cent were married and the mean age was 37 (SSB, 2008a). Figures from the China Urban Labor Survey (CULS), a survey administered by the Chinese Academy of Social Sciences in six major cities in 2010, are similar; 55.3 per cent of the urban population were male, 80.1 per cent were married and the average age was 37.5 (CASS, 2010). Those with a junior middle school education or less are slightly under-represented and those with a tertiary degree are slightly over-represented relative to

the urban population as a whole. The average years of schooling for the sample was 12.56 years for males and 12.43 years for females. The average years of schooling in the CULS 2010 survey for urban employees was 11.46 years (CASS, 2010).

That the better educated are over sampled in this survey is a limitation of the survey. Oversampling of better-educated individuals reflects the fact that many of the surveys were collected in a public setting. Holbrook *et al* (2003) found that the educational levels of respondents are often skewed when data are collected in public settings. The reason is that respondents with a lower education level are generally reluctant to respond to surveys when asked to participate in a public setting, as they believe they may have more to lose. Other studies which use publicly collected information, collected in China often suffer from the same limitation, even when the dataset is collected from a large number of cities (see eg. Nielsen & Smyth, 2008).

The PWI is a seven item global scale measured on a 0-10 end-defined scale, ranging from 'completely dissatisfied' (0) to 'completely satisfied' (10). Following the standard approach in the literature, the Likert scale was standardized into units of %SM on a 0-100 distribution. The PWI asks people how satisfied they are in relation to seven life domains: standard of living, personal health, achievement in life, personal relationships, personal safety, community-connectedness and future security. Extensive psychometric analyses have demonstrated the reliability, sensitivity and validity of this measure of subjective wellbeing in western and Chinese samples. Cronbach's alpha corresponding to this measure lies between 0.70 and 0.85, indicating cultural sensitivity. Test-retest reliability coefficients are significant across one to two week intervals. Construct validity has been determined for this measure as

each of the seven domains typically explains about 30 to 60 per cent of the variance in 'satisfaction with life as a whole'. The seven domains also consistently form a single stable factor, accounting for 50 per cent of the variance in subjective wellbeing (see studies reviewed in International Wellbeing Group, 2006 for more details).

The factor structure of the PWI was confirmed using confirmatory factor analysis. The seven items of the PWI formed a single factor. Cronbach alpha, inter-domain correlations and covariances confirmed internal reliability while bivariate correlations confirmed the validity of the PWI. Among the PWI items, the seven item satisfaction ratings were averaged to create the PWI composite variable, which is the dependent variable in the models reported below. For further information on the psychometric properties of the PWI with the data used in the current study see Smyth *et al.* (2010).

Insert Table 3

Table 3 reports the mean satisfaction ratings for the PWI for males and females. The mean for the PWI is in the normative range of 60-70 attained in other studies for Chinese respondents (see Davey & Rato, 2012) There are no significant gender differences in the PWI score. There are, however, statistically significant differences in five of the seven domains at the 5 per cent level or better. Males were statistically more content with personal health and future security, while females were statistically more content with life achievement, personal relationships and standard of living.

Empirical Methodology

Subjective wellbeing and male and female earnings

We employ a Mincer (1974) earnings function in which for each of males and females gross monthly income including bonuses (measured in RMB) is regressed on years of

schooling, age, age squared, the PWI, marital status and occupation, ownership and city dummies. There are two problems with the OLS estimates of the earnings function. First, the omission of an individual's ability may bias the OLS estimates of returns to schooling. Second, there is potential reverse causation between the PWI and income. Thus, in addition to OLS, we also present IV estimates in which we instrument for years of schooling and subjective wellbeing. The practical difficulty with IV estimation is finding instruments that are significantly correlated with education and subjective wellbeing in this case, but also orthogonal to the residuals of the main equation (in our case, monthly income). Our dataset does not contain any such candidates. Hence, we use the Lewbel (2012) IV approach.

The estimation problem in the current study can be summarized as

$$Y_1 = X'\beta_1 + Y_2\,\gamma_1 + \epsilon_1 \qquad \epsilon_1 = \alpha_1 U + V_1$$

$$Y_2 = X'\beta_2 + \epsilon_2 \qquad \epsilon_2 = \alpha_2 U + V_2$$

$$Y_3 = X'\beta_3 + \epsilon_3 \qquad \epsilon_3 = \alpha_3 U + V_3$$

Y_1 is income, Y_2 is education and Y_3 is the PWI in the above set of equations. U denotes the individual's unobserved characteristics, which effect his or her education level, subjective wellbeing and income. V_1, V_2 and V_3 are idiosyncratic errors.

Some of the structural parameters in the above equations are not identifiable without additional information. Generally, one obtains the identification by either imposing equality constraints on the coefficients of X (i.e. adopting OLS regression) or, assuming that one or more elements of β_1 are equal to zero. This permits the estimation of the Y_1 equation using two-stage least squares (TSLS) with instruments X. (i.e. using IV). Alternatively, assume Z is a vector of observed exogenous

variables (Z could be a subset of X or could be equal to X). Lewbel (2012) argues that, as long as the following moment conditions are satisfied:

$$E(X\epsilon_1) = 0, \quad E(X\epsilon_2) = 0, \quad E(X\epsilon_3) = 0, \quad Cov(Z, \epsilon_1\epsilon_2\epsilon_3) = 0$$

and some heteroskedasticity of ϵ_j are met, one can estimate the above set of equations by using $[Z - E(Z)]\epsilon_2$ and $[Z - E(Z)]\epsilon_3$ as instruments. However, as ϵ_2 and ϵ_3 are population parameter and cannot be directly observed, we use their sample estimates, obtained from the first stage regression. In the main results we use all the elements of *X (= Z)* to estimate instruments. In robustness checks, we also report results using different choices of Z, where each choice of Z represents a subset of X. The results using this approach prove to be quantitatively similar to using *X (= Z)*

The exact heteroskedasticity requirement, as derived in Lewbel (2012), is $cov(Z, \epsilon_2^2) \neq 0$ and $cov(Z, \epsilon_3^2) \neq 0$. However Lewbel (2012) suggests using the estimate of the sample covariance between Z and the squared residuals from a linear regression of Y_2 on X and Y_3 on X to test for this requirement using the Breusch-Pagan test for heteroskedasticity. Lewbel (2012) noted that if $cov(Z, \epsilon_2^2)$ and $cov(Z, \epsilon_3^2)$ are close to or equal to zero, then $[Z - E(Z)]\epsilon_2$ and $[Z - E(Z)]\epsilon_3$ will be a weak instruments and this will be reflected in imprecise estimates with large standard errors. In our data the Breusch-Pagan test for heteroskedasticity is highly significant, indicating that the sample estimate of $cov(Z, \epsilon_2^2)$ and $cov(Z, \epsilon_3^2)$ is different from zero and that the heteroskedasticity requirement for Lewbel(2012) is satisfied.

Decomposition of the gender wage gap

The Blinder-Oaxaca decomposition entails decomposing the wage differential between males and females into two parts. The first part is that explained by group differences in productivity characteristics and the second part, referred to as the residual or unexplained component, comprises of any wage differential that cannot be explained by differences in wage determinants. Assume we have two groups, males (M) and females (F) and the outcome variable, (log) monthly income, denoted by Y. We also have a set of explanatory variables, denoted by X. The question of interest is how much of the mean income difference, $R = E(Y_M) - E(Y_F)$, is accounted for by group differences in the explanatory variables (such that $E(Y)$ denotes the expected value of the income variable). Based on the following specifications for each group:

$$Y_M = X'_M\beta_M + \epsilon_M, \qquad E(\epsilon_M) = 0$$

$$Y_F = X'_F\beta_F + \epsilon_F, \qquad E(\epsilon_F) = 0$$

the mean income difference can be written as the difference in the linear prediction at the group-specific means of the explanatory variables:

$$R = E(Y_M) - E(Y_F) = E(X_M)'\beta_M - E(X_F)'\beta_F$$

as $E(\beta_M) = \beta_M$, $E(\beta_F) = \beta_F$, $E(\epsilon_M) = 0$ and $E(\epsilon_F) = 0$ by assumption.

In order to identify the contribution of group differences in explanatory variables to the overall income differences, the above equation can be rearranged as follows:

$$R = [E(X_M) - E(X_F)]'\beta_F + E(X_F)'(\beta_M - \beta_F) + [E(X_M) - E(X_F)]'(\beta_M - \beta_F)$$

The above equation, known as three-fold decomposition, can be simplified as:

$$R = E + C + I$$

The first part $E = [E(X_M) - E(X_F)]'\beta_F$, is known as the endowment effect and it captures that part of the income differential that is due to group differentials in explanatory variables. The second part, $C = E(X_F)'(\beta_M - \beta_F)$ captures the differences in the coefficients (including the differences in the intercept), whereas the

third part, $I = [E(X_M) - E(X_F)]'(\beta_M - \beta_F)$ is an interaction term capturing the differences in endowments and coefficients that exists simultaneously between the groups. We are interested in evaluating how much of the gender income gap is due to differences in education and how much is due to differences in subjective wellbeing between males and females. Contributions of the individual explanatory variables to the total differential are the sum of individual contributions. Hence, the three terms in the above decomposition equation can be broken down as:

$$E = [E(X_M) - E(X_F)]'\beta_F$$

$$= [E(X_{1M}) - E(X_{1F})]'\beta_{1F} + [E(X_{2M}) - E(X_{2F})]'\beta_{2F} + \dots\dots$$

$$C = E(X_F)'(\beta_M - \beta_F) = E(X_{1F})'(\beta_{1M} - \beta_{1F}) + E(X_{2F})'(\beta_{2M} - \beta_{2F}) + \cdots$$

$$I = [E(X_M) - E(X_F)]'(\beta_M - \beta_F)$$

$$= [E(X_{1M}) - E(X_{1F})]'(\beta_{1M} - \beta_{1F})$$

$$+ [E(X_{2M}) - E(X_{2F})]'(\beta_{2M} - \beta_{2F}) + \cdots$$

X_1, X_2, ... are explanatory variables and β_1, β_2, ... are the associated coefficients.

Results

Subjective wellbeing and male and female earnings

Table 4 presents the OLS estimates for male and female earnings. An additional year of education increases male income by 6.3 per cent and female income by 7.2 per cent. A one standard deviation change in male education (3.28 years) is associated with a 20.6 per cent change in earnings, whereas a one standard deviation change in female education (3.08 years) is associated with 22.2 per cent change in earnings. The OLS estimates reported here for education are generally similar to findings from other studies for urban China for the same period (see eg. Ren & Miller, 2012).

Insert Table 4

The coefficient on the PWI is significant with a positive sign for both genders and, as hypothesized, the relationship between subjective wellbeing and income is stronger for males than females. A 1 percentage point increase in subjective wellbeing is associated with a 0.5 per cent increase in income for males and a 0.3 per cent increase in income for females. In terms of standard deviation changes, a one standard deviation change in subjective wellbeing for males (14.67) is associated with a 7.3 per cent change in income, whereas a one standard deviation change in subjective wellbeing for females (14.13) is associated with 4.2 per cent change in income

The sign on the coefficients for most of the other variables were as expected and consistent with previous findings for urban China and other countries. Income peaks at 43.10 years for males and 39.4 years for females. Female cadres earn 31.8 per cent more than non-cadres, while male cadres earn 35.9 per cent more than non-cadres. Females in the non-state sector earn 8.11 per cent less than females in the state sector, although there is no statistical difference between male wages in the state and non-state sectors. The coefficient on marital status was statistically insignificant.

We now turn to the Lewbel (2012) IV estimates. A precondition for the implementation of the Lewbel (2012) method is the existence of heteroskedasticity in the data. The Breusch-Pagan test for heteroskedasticity for males and females rejected the null of constant variance for education and subjective wellbeing.

Insert Table 5

Table 5 presents the Lewbel (2012) IV estimates, instrumenting for both subjective wellbeing and years of schooling. In contrast to the OLS estimates, the returns to schooling are higher for males than females. In the IV estimates an additional year of

education increases male income by 9.7 per cent and female income by 5.6 per cent. This result implies that a one standard deviation change in male education is associated with a 31.8 per cent change in earnings, whereas a one standard deviation change in female education is associated with 17.3 per cent change in earnings.

Comparing the OLS and IV estimates for returns to schooling, we find that the OLS estimates exhibit downward bias for males and upward bias for females. Chen and Hamori (2009) and Kang and Feng (2012) also find this to be the case. That the returns to schooling are higher for females than males in the OLS estimates is consistent with most previous studies for urban China (see eg. Gustafsson & Li, 2000). The usual reason which is given is that this result reflects the relative dearth of highly educated females in urban China (Li, 2003). The results from the IV model that the returns to schooling for males are higher than females are consistent with Chen and Hamori (2009), Qian and Smyth (2008), Kang and Peng (2012) and Ren and Miller (2012) for similar time periods as ours. One possible explanation, suggested by Ren and Miller (2012), is the rapid growth in the number of female graduates since 2000, which has served to negate the undersupply of highly skilled female professionals in urban China. For example, in 2006, in the year prior to the survey used in this study, females comprised 48.9 per cent of undergraduate students and 44.5 per cent of masters' students in China (Tan & Jiang, 2008).

The IV estimates also suggest that the relationship between subjective wellbeing and income is stronger for males than females. The coefficient on subjective wellbeing is positive and significant for males, but is statistically insignificant for females. The IV estimates suggest that a 1 percentage point increase in subjective wellbeing is associated with a 1 per cent increase in income for males. Thus, a one standard

deviation change in subjective wellbeing for males is responsible for a 14.7 per cent change in income. To put this result into perspective, an additional year of schooling for males is equivalent to a 9-10 percentage point increase in the PWI for males. The results for the other variables in Table 5 are similar to those reported in Table 4. Male and female cadres earn more and females earn less in the non-state sector. Income peaks at 43.6 years for males and 38.9 years of age for females.

The Lewbel estimates are obtained using $[Z - E(Z)]\widehat{\epsilon_2}$ and $[Z - E(Z)]\widehat{\epsilon_3}$ as instruments, where Z could be a subset of X or equal to X. The Lewbel estimates reported in Table 5 are based on $Z = X$. One might be worried that the Lewbel IV coefficients are sensitive to the particular choice of Z i.e. one subset of X may give a completely different results than another subset. In order to test for this sensitivity we re-estimated Table 5, with Z as a subset of X. Table 6 reports the coefficients of years of schooling and PWI for different choice of Z (each representing a subset of X). The coefficients on years of schooling and the PWI are similar to Table 5 (duplicated again in the top row in each panel). This suggests that Lewbel estimates obtained are robust to the choice of Z.

Insert Tables 6 & 7

If the conjecture of studies in organizational psychology is correct that the relationship between subjective wellbeing and productivity are non-linear, it follows that the relationship between subjective wellbeing and income might be non-linear. In Panel A of Table 7 we test for non-linear subjective wellbeing effects by breaking the sample into three sub-samples, corresponding to the bottom 25 per cent of scores on the PWI (PWI range 0-58), the middle 50 per cent of scores on the PWI (PWI range 59-78) and the top 25 per cent of PWI (PWI range 79 to 100). We only report the

coefficients on education and subjective wellbeing, although we included a full set of controls as in Tables 4 and 5. The results indicate a significant relationship between subjective wellbeing and income for those in the bottom 25 per cent of subjective wellbeing scores, but not the middle and top categories, which is consistent with a curvilinear relationship between subjective wellbeing and income. Panel A suggests there is diminishing returns to subjective wellbeing with the relationship ceasing to be statistically significant at about the lower bound of the normative range for the PWI of 60-70. For those in the bottom 25 per cent of the PWI scores, the relationship between subjective wellbeing and wages is stronger for males than females.

Panel B reports the results for the PWI and PWI squared from a Mincer earnings function. Again, we included a full set of controls, although these are not reported. The results in Panel B suggest a statistically significant non-linear relationship between subjective wellbeing and income. The coefficients on the PWI and PWI squared variables indicate that income peaks when subjective wellbeing is at very high levels - the PWI is 89.6 for males and 81.7 for females – and falls thereafter. Figure 2 plots the relationship between subjective wellbeing and income, based on the estimates in Panel B with each of the variables, except the PWI, fixed at their mean values. This figure, based on estimated values, suggests that the relationship between subjective wellbeing and income is very similar to the hypothesized relationship between subjective wellbeing and productivity in Figure 1.

Insert Figure 2

The most likely explanation for the nonlinear relationship is that subjective wellbeing is associated with an improvement in work/life balance, such that at high levels of

subjective wellbeing there is an adjustment in the work/life balance in favor of the non-work domain with a commensurate fall in productivity and income. Another possible explanation is that at very high levels of subjective wellbeing, individuals may allocate such large amounts of time to 'broaden and build' human capital and psychological capital, creative activities, helping behaviors and the like that productivity, and income, fall. A third possible explanation is that the theory of subjective wellbeing homeostasis, which underpins the PWI, predicts that subjective wellbeing will be protected by internal and external buffers (Cummins, 1998). One of the main external buffers is income (Cummins, 2000). At very high levels of subjective wellbeing it becomes much less important to maintain income as an external buffer. Thus, individuals may reallocate their time to other non-work activities. Unfortunately, we cannot examine this point directly because we do not have data on the number of hours which individuals in the sample work per week.

Decomposition of the gender wage gap

In the final columns of Tables 4 to 7 we present the difference in coefficients for the male and female samples for education and subjective wellbeing, as well as their associated significance values. We do not find significant gender differences in returns to subjective wellbeing. However, in the OLS results there are significant differences in the returns to schooling at the 5 per cent level that benefits females.

Insert Table 8

In Table 8 we report the results of Blinder-Oaxaca decomposition for gender wage gap. The overall differential; that is, the difference in the log of monthly income between males and females, is 17.1 per cent. This result is similar to other studies of the gender wage gap in urban China (see eg. Gustafsson & Li, 2000). In rows 1 and 2 we decompose the gender wage gap into the share that is attributable to endowments;

that is, factors measuring productivity, and the share due to unexplained factors; that is, difference in the coefficients. Out of the 17.1 per cent difference in income between males and females, 15.5 per cent is explained by endowments and 81.3 per cent (or 84 per cent if we include interactions) is due to difference in coefficients.

Our main interest is in the decomposition results for education and subjective wellbeing. The decomposition results for education are reported in rows 4 and 7 and the decomposition results for subjective wellbeing are reported in rows 5 and 8. We find that 5.4 per cent of the gender wage gap can be attributed to differences in endowments of education (favoring males) and 62.3 per cent to differences in the returns to schooling (favoring females). In terms of subjective wellbeing, we find that 0.2 per cent of the gender wage gap can be attributed to differences in mean subjective wellbeing (favoring females) and 53.5 per cent to differences in the labor market rewards/penalties to subjective wellbeing (favoring males).

Males have a higher endowment of education than females and this contributes to increasing the gender wage gap, but males have a lower endowment of subjective wellbeing than females and this contributes to lowering the gender wage gap. In terms of the coefficients, males have lower returns to education than females, which contributes to lowering the wage gap, while males have higher returns to subjective wellbeing than females and this contributes positively to the gender wage gap.

Conclusion

There is a large literature that has examined the role of income (and relative income) in influencing subjective wellbeing (see Clark *et al.,* 2008 for a review). There are, however, few studies that have addressed the question: Does it pay to be happy? In this study we have examined how subjective wellbeing influences income using a

dataset collected from six cities in China. We have extended the literature in three directions. First, we have used the methodology proposed by Lewbel (2012) to tackle the thorny issues of endogeneity of education and subjective wellbeing in the absence of conventional IVs. Second, we have employed, arguably, a better measure of subjective wellbeing than in related previous studies. The PWI represents an improvement over existing measures of subjective wellbeing in the literature, particularly single item indicators, because it is valid and because it is a trait measure. This allows us to look at long-run relationships, which are of more practical relevance than transitory fluctuations in subjective wellbeing and income. Third, we have decomposed the gender wage gap and examined the contribution of endowments of, and returns to, subjective wellbeing to explaining differences in male-female income.

We hypothesized that the relationship between subjective wellbeing and income would be stronger for males than females. The findings are consistent with this hypothesis. In the OLS results, the returns to subjective wellbeing are higher for males than females and in the IV estimates the coefficient on subjective wellbeing is significant (and large) for males, but not females. Based on the OLS results, the coefficients explain 81 per cent of gender wage gap. Of that 81 per cent, returns to education reduce the gender wage gap by 62 per cent and returns to subjective wellbeing increase the gender wage gap by 53 per cent. We also find evidence, consistent with the organizational psychology literature on the happy-productive worker thesis, that the relationship between subjective wellbeing and income is non-linear. To be specific, we find that income peaks at very high levels of subjective wellbeing and, consistent with the hypothesis that the relationship between subjective wellbeing and income is stronger for males than females, we find that income peaks at higher levels of subjective wellbeing for males than females.

In concluding, we emphasize some limitations of our study and point to some directions for future research. First, in terms of our dataset, while it is generally representative of the urban population in China along a number of dimensions, the better educated are slightly over represented. Second, we do not have data on hours worked so we cannot calculate the hourly wage rate. This is a common problem estimating earnings functions with Chinese data. In their meta-analysis of estimates of the returns to schooling in China, Liu and Zhang (2012) found that only 30 per cent of estimates used hourly wages as the dependent variable. Never the less, it should be noted that this means that our estimates for returns to schooling represent lower bound estimates (Li, 2003). Third, while we have used the Lewbel (2012) method to construct internal IVs, it would be preferable for robustness purposes to have conventional IVs to check the reliability of our findings. The problem is that valid conventional IVs, at least for psychological capital variables, typically do not exist.

Despite these limitations, we think that our results point to the importance of continuing to explore the effect on the gender wage gap of subjective wellbeing in other labor market contexts as well as possible determinants of gender preferences more generally, such as competitiveness, personality and risk preferences (see also Nyhus & Pons, 2012). Such analysis, drawing on insights from economics and psychology, is likely to improve our understanding of the causes of the gender wage gap and, as such, better inform policies that are designed to address it.

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Tables and Figures

Table 1: Characteristics and representativeness of respondents across six cities

	Fuzhou	Chengdu	Wuhan	Fushun	Dalian	Fuxin
Characteristics of respondents						
Gender	%	%	%	%	%	%
Male	49.8	53.5	40.6	46.6	40.5	59.0
Female	50.2	46.5	59.4	53.4	59.5	41.0
Marital status	%	%	%	%	%	%
Single	46.9	43.8	34.2	26.8	43.2	14.8
Married	53.1	56.2	65.8	73.2	56.8	85.2
Age						
Mean	32.93	29.85	33.72	35.37	31.84	36.00
SD.	10.72	8.23	10.29	8.38	7.93	7.31
Educational level	%	%	%	%	%	%
Junior middle school or below	5.9	11.1	8.7	4.3	4.2	13.4
Senior middle school	14.2	29.3	25.1	17.8	6.3	29.1
Technical school	28.9	26.1	30.4	34.8	21.2	27.1
Bachelor degree	41.8	29.0	29.1	38.9	53.4	26.9
Masters or PhD	9.2	4.4	6.6	4.2	14.9	3.5
Average monthly income	RMB	RMB	RMB	RMB	RMB	RMB
	%	%	%	%	%	%
500 or below	1.8	5.0	3.9	2.7	0.2	9.0
501-1000	17.3	25.3	27.1	14.1	6.1	30.1
1001-1500	22.2	18.0	23.8	23.7	14.6	27.3
1501-2000	22.4	24.6	16.9	23.5	23.6	21.0
2001-5000	29.2	22.4	24.1	35.4	47.7	11.0
over 5000	6.9	4.7	4.1	0.6	7.8	1.6
Mean	2602	2100	1901	1864	2702	1446
How representative is the income of respondents?						
	RMB	RMB	RMB	RMB	RMB	RMB
Average monthly income in the relevant city	2355	2217	2094	1999	2356	1540
Average monthly urban income in the province	1856	1756	1629	1906	1906	1906
Average monthly urban income in the region (coastal, central, south-west, north-east)	2552	1701	1725	1714	1714	1714

Notes: Data on average monthly income in the city, province and region are from SSB (2008a, 2008b).

Table 2: Descriptive statistics of the explanatory variables

	Min	Max	Mean	SD
Male (N = 1356)				
Age (Years)	17.00	60.00	33.90	9.17
Education (Years)	6.00	18.00	12.56	3.28
PWI	0.00	100.00	67.42	14.67
ln(Income)	8.70	11.00	10.02	0.64
Marital Status	Single = 476 (35.10%), Married = 880 (64.90%)			
Occupation	Cadres = 334 (24.63%), Ordinary Staff = 1,022 (75.37%)			
Ownership	State-Sector = 704 (51.92%), Non-State sector = 652 (48.08%)			
City	Fuzhou = 192 (14.16%), Chengdu = 252 (18.58%), Wuhan = 220 (16.22%), Fushun = 229 (16.89%), Dalian = 215 (15.86%), Fuxin = 248 (18.29%)			
Female (N = 1512)				
Age (Years)	16.00	60.00	32.37	8.71
Education (Years)	6.00	18.00	12.43	3.08
PWI	12.86	100.00	67.49	14.13
ln(Income)	8.70	11.00	9.84	0.62
Marital Status	Single = 530 (35.05%), Married = 982 (64.95%)			
Occupation	Cadres = 227 (15.01%), Ordinary Staff = 1,285 (84.99%)			
Ownership	State-Sector = 759 (50.20%), Non-State sector = 753 (49.80%)			
City	Fuzhou = 203 (13.43%), Chengdu = 206 (13.62%), Wuhan = 331 (21.89%), Fushun = 264 (17.46%), Dalian = 322 (21.30%), Fuxin = 186 (12.30%)			

Table 3: Difference in PWI for males and females

	Males (N = 1356)		Females (N = 1512)		t-statistics	Sig.
	Mean	SD	Mean	SD		
Satisfaction with …						
Standard of living	60.6	20.1	62.4	19.4	−2.47	0.01
Health	71.3	19.2	69.9	19.4	2.05	0.04
Life achievement	63.9	20.7	65.4	20.5	−1.97	0.05
Personal relationships	74.7	15.6	75.9	15.5	−2.04	0.04
Personal safety	71.9	19.9	70.6	19.7	1.78	0.08
Feeling part of the community	65.0	21.1	64.2	21.8	1.02	0.31
Future security	62.5	23.5	60.9	22.3	2.00	0.05
PWI	67.42	14.67	67.49	14.13	0.13	0.89

Table 4: OLS estimates of male and female earnings

Variables	Male	Female	$(b_m - b_f)$
Education (Years)	0.0637***	0.0722***	-0.012**
	(13.90)	(15.92)	(-1.97)
PWI	0.00501***	0.00366***	0.0013
	(5.398)	(3.956)	(0.97)
Age (Years)	0.0844***	0.0715***	
	(6.609)	(5.435)	
Age Squared	-0.000979***	-0.000907***	
	(-6.093)	(-5.315)	
Married (1 = Yes)	-0.0100	0.0221	
	(-0.245)	(0.554)	
Occupation (1 = Ordinary Staff)	-0.359***	-0.318***	
	(-10.66)	(-8.519)	
Ownership (1 = Non-State Sector)	0.0165	-0.0811***	
	(0.567)	(-2.902)	
City Dummies			
Chengdu	-0.0121	-0.00352	
	(-0.251)	(-0.0698)	
Wuhan	-0.0160	-0.110**	
	(-0.326)	(-2.426)	
Fushan	-0.0568	0.00742	
	(-1.148)	(0.155)	
Dalian	0.188***	0.254***	
	(3.762)	(5.614)	
Fuxin	-0.390***	-0.279***	
	(-7.653)	(-5.274)	
Constant	7.549***	7.703***	
	(30.60)	(31.31)	
Observations	1,356	1,512	
R-squared	0.403	0.344	

Notes: t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1; reference for city dummies is Fuzhou.

Table 5: Lewbel IV estimates of male and female earnings where education and subjective wellbeing (PWI) are treated as endogenous variables

Variables	Male	Female	$(b_m - b_f)$
Education (Years)	0.0974***	0.0564***	-0.011
	(5.491)	(2.956)	(-1.60)
PWI	0.0103***	-0.00814	0.0012
	(2.580)	(-1.263)	(0.79)
Age (Years)	0.0846***	0.0676***	
	(6.273)	(4.605)	
Age Squared	-0.000970***	-0.000867***	
	(-5.684)	(-4.534)	
Married (1 = Yes)	0.00213	0.0637	
	(0.0453)	(1.172)	
Occupation (1 = Ordinary Staff)	-0.296***	-0.351***	
	(-6.925)	(-8.075)	
Ownership (1 = Non-State Sector)	0.0474	-0.104***	
	(1.330)	(-2.755)	
City Dummies			
Chengdu	0.0233	-0.0593	
	(0.427)	(-0.964)	
Wuhan	0.00866	-0.131**	
	(0.169)	(-2.521)	
Fushan	-0.0569	0.00385	
	(-1.115)	(0.0717)	
Dalian	0.150***	0.272***	
	(2.678)	(5.373)	
Fuxin	-0.311***	-0.257***	
	(-4.668)	(-4.115)	
Constant	6.661***	8.799***	
	(15.64)	(15.14)	
Observations	1,356	1,512	
R-squared	0.360	0.267	

Notes: t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1; reference for city dummies is Fuzhou.

Table 6: Sensitivity of Lewbel IVestimates to the choice of Z

ln(Income)	**Male**	**Female**	**($b_m - b_f$)**
Coefficient on Years of Schooling			
Z = All of X	0.0974***	0.0564***	-0.011
	(5.491)	(2.956)	(-1.60)
Z = {Age, Marital status, Occupation, Ownership and City dummies}	0.0987***	0.0557***	-0.0122
	(5.329)	(2.968)	(-1.56)
Z = {Age, Occupation, Ownership and City dummies}	0.122***	0.0524***	-0.0121
	(5.245)	(2.611)	(-1.53)
Z = {Age, Ownership and City dummies}	0.121***	0.0560***	-0.0133
	(5.202)	(2.865)	(-1.64)
Coefficient on PWI			
Z = All of X	0.0103***	-0.00814	0.0012
	(2.580)	(-1.263)	(0.79)
Z = {Age, Marital status, Occupation, Ownership and City dummies}	0.00964**	-0.00605	0.0011
	(2.301)	(-0.881)	(0.88)
Z = {Age, Occupation, Ownership and City dummies}	0.0102**	-0.00581	0.0012
	(2.257)	(-0.775)	(0.81)
Z = {Age, Ownership and City dummies}	0.00996**	-0.00497	0.0012
	(2.088)	(-0.658)	(0.85)

Notes: t-statistics in parentheses; *** denotes significance at 1%.

Table 7: Testing for Non-linear effects of subjective wellbeing on income

Variables	Male	Female	$(b_m - b_f)$
Panel A – Sub-samples based on the PWI score			
Bottom 25% [PWI Range: 0 – 58]			
Education (Years)	0.0596***	0.0822***	-0.014
	(6.338)	(8.990)	(-1.15)
PWI	0.00898***	0.00646**	0. 0009
	(3.264)	(2.105)	(0.24)
Observations	328	376	
R-squared	0.428	0.344	
Middle 50% [PWI Range: 59 – 78]			
Education (Years)	0.0610***	0.0722***	-0.014*
	(10.02)	(10.98)	(-1.75)
PWI	0.00274	0.00183	0.0013
	(0.827)	(0.557)	(0.28)
Observations	710	761	
R-squared	0.407	0.333	
Top 25% [PWI Range: 79 – 100]			
Education (Years)	0.0675***	0.0649***	-0.009
	(6.289)	(7.312)	(-0.70)
PWI	-0.00146	-0.00312	0.004
	(-0.260)	(-0.594)	(0.54)
Observations	318	375	
R-squared	0.350	0.387	
Panel B - Using PWI squared to capture non-Linearities			
Education (Years)	0.0638***	0.0718***	-0.011*
	(13.95)	(15.84)	(-1.91)
PWI	0.0167***	0.0176***	0.0008
	(3.368)	(2.924)	(0.65)
PWI Squared	-0.000093**	-0.00011**	
	(-2.398)	(-2.344)	
Observations	1,356	1,512	
R-squared	0.406	0.346	

Notes: t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1; usual control variables, as per Tables 4 and 5 used in each specification.

Table 8: Male-female differences in endowments and coefficients

Description	Coefficient	Percentage of Gross Difference
Log Monthly Income	0.171	
Differences due to		
(1) Endowments	0.0264	15.51%
(2) Coefficients	0.1396	81.33%
(3) Interaction	0.0045	2.65%
Differences due to endowments		
(4) Education (Years)	0.0092	5.39%
(5) PWI	-0.00026	-0.15%
(6) Other Endowments	0.0175	10.27%
Differences due to coefficients		
(7) Education (Years)	-0.1062	-62.31%
(8) PWI	0.0912	53.47%
(9) Other Coefficients	0.1546	90.67%
Differences due to Interactions		
(10) Education (Years)	-0.00108	-0.64%
(11) PWI	-0.00010	-0.06%
(12) Other Interactions	0.0057	3.35%

Figure 1: Projected relationship between productivity and subjective wellbeing for males and females

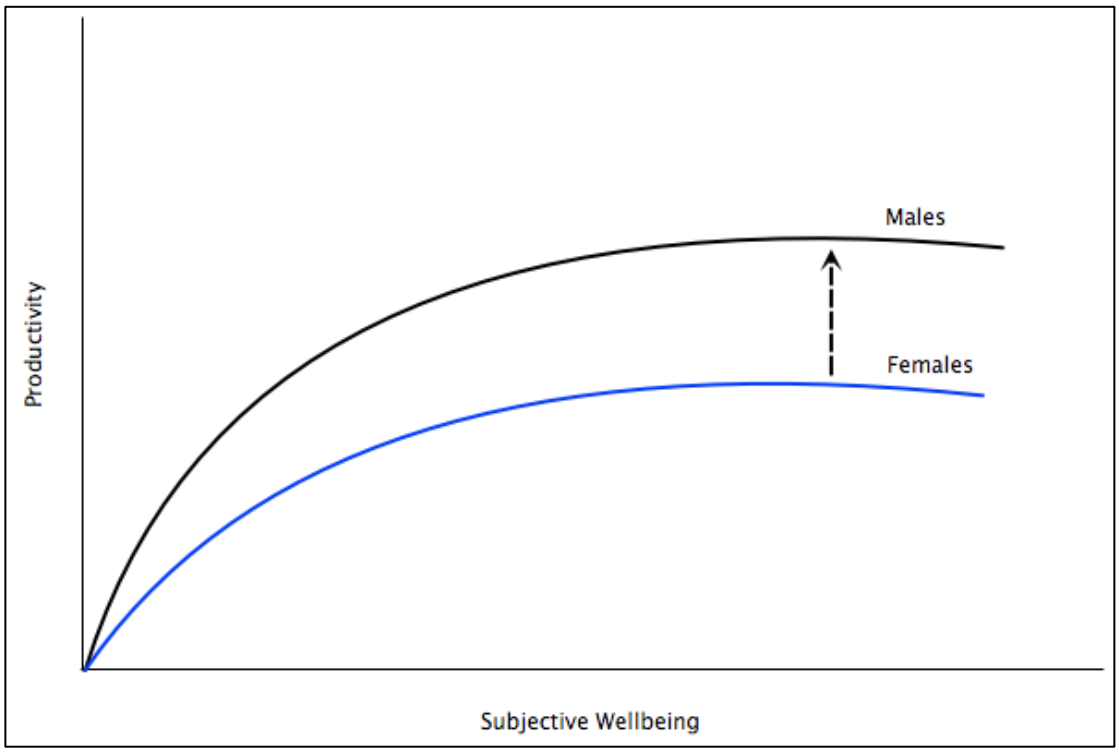

Figure 2: Estimated relationship between ln(Income) and subjective wellbeing for males and females (with all the other variables fixed at their sample means) based on estimates of Table 7 – Panel B