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ABSTRACT

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We estimate the dual effects of immigration and obesity on labor market outcomes in the UK. There is only one other paper that has estimated these dual effects on a sample of immigrants to the US. We use the British Household Panel Survey, which contains information on height and weight for 2004 and 2006, along with immigration status and labor market outcomes. This was a period of increased immigration to the UK resulting in large part from the accession of new EU member states, though our sample includes both recent arrivals and those who have been in the UK for decades. We first analyze an immigrant-only sample and then expand the sample to compare the experience of these immigrants to natives with similar weight and other observable characteristics. We find support for the "healthy immigrant hypothesis" that suggests that immigrants are less likely to be obese than natives, and also evidence of an assimilation effect in which immigrants' weight increases with their time in the UK. The results indicate a wage premium and higher proportions of white collar work for immigrant men, but a wage penalty and lower proportions of white collar work for overweight and obese immigrant men. We find weaker but still negative associations between weight and labor market outcomes for immigrant women. Data limitations preclude efforts to address endogeneity, so these findings should be viewed as associations that support the need for better data for additional analysis of the dual effects of immigration and obesity on labor market outcomes.

JEL Classification: I10, J15, J31

Keywords: immigrant, obesity, labor market outcomes

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1. Introduction

A large body of research suggests that immigrants are often substantially more productive and healthier than both natives in their host countries and non-migrators remaining in their countries of origin (e.g. Chiswick, 1978; Borjas, 1985, 1995; Park et al., 2009; Antecol and Bedard, 2006; Kennedy, McDonald and Biddle, 2006). Despite likely productivity advantages, immigrants typically face a wage penalty upon entry to the host country. Studies suggest that poor English language ability and the possession of foreign qualifications make it difficult for immigrants to assimilate to the labor market of the host country (Trejo, 1997; Friedberg, 2000; Shields and Wheatley Price, 2002). Over time, through investments in location specific human capital, immigrants tend to assimilate though their wages and employment do not always converge to those of natives (Chiswick, 1978; Carliner, 1980; Borjas, 1985, 1995; Trejo, 1997; Friedberg, 2000).

Similarly, there is a consistent finding that immigrants tend to be healthier upon arrival to their new homes but eventually assimilate to the less healthy patterns of their host countries, this is often termed the healthy immigrant effect (e.g. Hao and Kim, 2009; Antecol and Bedard, 2006; McDonald and Kennedy, 2007). Many of these studies focus on weight-related health outcomes and note that immigrants are less likely to be obese than their native-born counterparts. There is also a substantial literature on the link between obesity and labor market outcomes (see Averett, 2011 for a review of this literature). The evidence from these studies is mixed as to whether or not the obese face wage and employment penalties in the labor market.

Our objective is to explore the complex interactions among immigration, obesity and labor market outcomes. We know of only one study to date that specifically examines this potential double penalty faced by obese immigrants in the labor market (Cawley, Han and Norton, 2009). Specifically, Cawley, Han and Norton use a large US dataset comprised of

immigrants from developing countries to examine the effect of Body Mass Index (hereafter BMI) and indicator variables for the clinical weight classifications for overweight and obese to examine their effects on several labor market outcomes.[1] They find few significant wage penalties except for obese women who have been in the country a short time.

Whereas most of the previous literature on immigrant health, wages, and assimilation has focused on immigrants to the US, our study uses data from a nationally representative dataset from the UK covering the period 2004 to 2006, and extends the Cawley, Han and Norton (2009) analysis in two ways. First we examine immigrants in a European country that has recently experienced substantial immigration. Second, we expand their analysis to compare immigrants with non-immigrants. The UK presents a different context to examine the effect of immigration and body weight on labor market outcomes because most immigrants to the UK are not from developing countries.

We find some significant associations between weight and labor market outcomes for immigrants. Our results also indicate that immigrants overall do not fare poorly in the UK labor market, although, overweight and obese male immigrants face a wage penalty relative to both other immigrants and to overweight and obese natives.

To set the stage for our analysis we begin with a brief overview of migration to the UK and a description of the labor market conditions faced by these immigrants. We follow this with a review of the relevant literature. Following the review of the literature we turn to our empirical analysis. We first describe the key features of our UK data set. Then we replicate the Cawley, Han and Norton models on a sample of immigrants only. Our data allows us to extend the work of Cawley, Han and Norton by directly comparing the experiences of immigrants and natives

[1] BMI is measured as weight in kilometers divided by height squared where height is measured in meters, Clinical indicators for overweight and obesity in terms of BMI are ($25 \leq BMI < 30$) for overweight ($BMI \geq 30$) for obese.

with respect to both weight and labor market outcomes. We conclude with policy implications of our findings and directions for future research.

2. Migration and Labor Markets in the UK

As measured by the gross inflow of migrants, currently the UK is the third most popular destination for immigrants worldwide, behind only the US and Germany (OECD, 2011).[2] In the past few decades, immigration to the UK has been on the rise (see Wheatley Price, 2001 for a detailed history of UK immigration policy). In the period from 1975 to 1979 there was a net outflow of 21,000 people annually, but by 1994 to 1998 this trend had reversed and the UK was experiencing a net inflow of 73,000 migrants per year. This influx of immigrants increased particularly rapidly during the 1990s, and is responsible for about half of the population growth during that decade (Hatton and Tani, 2003). In May 2004, ten Central and Eastern European countries joined the European Union (EU). The UK, along with Ireland and Sweden, were the only EU countries to initially grant full free movement of workers to these new accession nationals (Sriskandarajah, 2004; Doyle et al., 2006). It is estimated that about 560,000 accession migrants joined the UK labor market between May 2004 and May 2006, which is roughly equivalent to 2 percent of total employment at that time. This is one of the largest inflows of migrants in British history (Salt and Miller, 2006). Since 2004 over 1,000,000 migrants from accession countries have arrived in the UK; approximately half are thought to have subsequently returned home (Health Protection Agency, 2008).

The profile of immigrants to the UK as reported in the British General Social Survey in the early 2000s suggests that 25.8 percent of recent immigrants migrated from continental Europe and Ireland (Kennedy, McDonald and Biddle, 2006). 18 percent originated from

[2] In 2009, the latest year for which data is available, the countries receiving the largest inflows of permanent foreign population immigrants according to OECD were, in order: US, Germany, UK, Spain, Canada and Australia.

countries in Asia, 29.8 migrated to the UK from Africa and the Middle East, 7.1 percent from Canada, Australia and New Zealand, and 9.4 percent from the US and Caribbean nations. This diverse group of immigrants joins a labor market that has been classified as one that is somewhat distinct from other European labor markets and shares some characteristics with the US labor market including relatively weak unions, wide and growing wage dispersion and high incidence of low-pay employment (Sapir, 2006). Rovelli and Bruno (2008) classify the UK as one of the countries with the least generous labor market protections in the EU, a high poverty-low labor market protection country. During our period of study, the UK unemployment rate was relatively low declining from 5.3 percent in 2000 to 4.8 percent in 2005.

3. Literature Review

In this section we draw together insights from previous work in three largely unconnected literatures, the literature on the healthy immigrant hypothesis, the literature on the assimilation of immigrants to the labor market of the host country, and the large and growing literature that examines the consequences of obesity on labor market outcomes. We briefly review each of these in turn to place our work in context.

3.1 The Healthy Immigrant Effect

The near consensus among researchers examining the status of immigrants upon arrival in developed countries points to a healthy immigrant effect (Choi, 2011; Hao and Kim, 2009; Park et al., 2009; Antecol and Bedard, 2006; McDonald and Kennedy, 2005; Tremblay et al., 2005; Kennedy, McDonald and Biddle, 2006). These studies suggest that upon arrival, immigrants exhibit better health than the native born in their new home country and are often healthier than those from their country of origin who do not migrate. In addition to reporting

better initial health across a number of more traditional dimensions such as health behaviors, the prevalence of chronic conditions, and self-reported health (Jasso et al., 2004; Kennedy, McDonald and Biddle, 2006), many studies examining this phenomenon note specifically that immigrants have lower BMIs and are less likely to be classified as overweight or obese at the time of immigration. For instance, using U.S. data from the 1998 National Health Interview Survey (NHIS), Kaplan et al. (2004) report that newly-arrived Hispanic immigrants are healthier and have lower BMIs and a lower incidence of obesity than do the native-born population. Only 19.7% of Hispanics who migrated to the U.S. were over the threshold for obesity compared to 28% of US born Hispanics. Similarly, Park et al. (2009) report significantly lower obesity rates for white, black, Hispanic and Asian immigrants to the US than for natives of the same race.

Some work has been done to try to disentangle the reasons for this healthy immigrant effect. A number of explanations have been offered (Antecol and Bedard, 2006; Kennedy, McDonald and Biddle, 2006; Hao and Kim, 2009). Individuals may migrate from countries that have substantially healthier nutrition and activity patterns. In addition, migrants may self select such that individuals investing in human capital through migration have chosen greater levels of health investment than non-migrators. It has also been suggested that the immigrant screening process may favor admission of only the healthiest immigrants. The pattern of healthy immigrants may also be caused, not solely by an inflow of healthy migrants, but by return migration of those in ill health (Hao and Kim, 2009).

Current research also examines the degree to which assimilation erodes the initial health advantage of immigrants. The longer immigrants remain in their new destination the more they may adopt the diet and exercise behaviors and attitudes of their new neighbors (Hao and Kim, 2009; Goel et al., 2004; Sorlie et al., 1993). For immigrants to Canada, the US, and Australia,

the adoption of native behaviors results in worse nutritional habits and increases in obesity (Hao and Kim, 2009; Antecol and Bedard, 2006 McDonald; and Kennedy 2005; Tremblay et al., 2005; Hauck and Hollingsworth, 2009). Where these immigrants have strong cultural ties to their home country or live in areas with concentrated ethnic enclaves the process of unhealthy assimilation may be slowed (Hao and Kim, 2009; McDonald and Kennedy, 2005)[3].

Many of the studies examining the healthy immigrant effect and convergence rely on cross-sectional data. Using repeated cross sections from the National Health Interview Survey Antecol and Bedard (2006) carefully control for fixed period-of-arrival cohort effects and find results that are in keeping with prior work. In their study, immigrants recently arrived in the US are healthier and have lower BMIs and a lower incidence of obesity than do their native-born counterparts. Specifically, female immigrants to the US are nearly 10 percentage points more likely to be obese at the time of migration than their native-born counterparts. Within 10 years of their entry to the US, these immigrant women lose 90% of their healthy weight advantage (Antecol and Bedard, 2006). Assimilation patterns have also been found to vary by education level. Increases in body weight are significantly more rapid for immigrants with less than a college degree (Kaushal, 2009).

The results describing immigrant selection and assimilation with regard to BMI and obesity are consistent across studies that examine immigrants to the US, Canada and Australia. In contrast, studies that have examined obesity rates and assimilation for migrants to Europe find less consistent evidence that immigrants are healthier than the native population. In part this may be due to differences in the predominant countries of origin among immigrants to Western Europe. Kirchengast and Schober (2006) find higher rates of overweight and obesity among

[3] While immigrants locating in dense ethnic enclaves have been found to gain an advantage in terms of health, such location may hinder their acquisition of the language in their host country and slow labor market assimilation (Chiswick, 2005).

adolescents recently migrating from Turkey and Yugoslavia to Austria. Studies in other countries report increased obesity and obesity-related health risks for migrants compared to natives in the Netherlands (Brussaard et al., 2001) and Germany (Bongard et al., 2002).

Our analysis focuses on immigrants to the UK and to date only one study has included an examination of obesity among these immigrants. In a comparative study of the general health of recent immigrants across four countries, Kennedy, McDonald and Biddle (2006) find a healthy immigrant effect for the recently arrived foreign born in the UK in terms of obesity as well as chronic conditions and self-reported health.

3.2 Immigrant Labor Market Assimilation to the Host Country

Much of the literature examining the wages of immigrants in their host country and their assimilation toward the level of wages paid to natives originated with studies of immigrants to the US (a classic paper is Chiswick, 1978). Beginning with studies examining wage penalties for immigrants, researchers sought to identify the degree to which the penalty and rate of assimilation are determined by language ability (Trejo, 1997; Chiswick and Miller, 2002), and the timing and location of education (Friedberg, 2000). In addition, Chiswick (1978) and Borjas (1985; 1995) emphasize that the selection process associated with international migration and the national origin mix of immigrants are crucial determinants of their labor market performance. In particular, those who choose to migrate are often those with better labor market prospects in the host country. Borjas (1985, 1995) finds evidence of substantial heterogeneity among immigrants and some evidence that individuals who invest in migration have greater earning potential. Finally, this literature has also examined changes in the quality of successive cohorts of immigrants (e.g. Borjas, 1995).

A segment of this literature empirically examines these issues in the UK (e.g. Chiswick, 1980; Bell, 1997 and Wheatley Price, 2001). Much of this research focuses on role of race. Chiswick (1980) found that white immigrants to the UK earned as much as their native counterparts but that non-white immigrants suffered a wage penalty as large as 25 percent which did not abate with increased time in the UK. Bell (1997) also finds that white immigrants fare well in the labor market while immigrants from the West Indies and India face an earnings disadvantage. As time since migration increases, the wage differential declines.

Shields and Wheatley Price (2002) find that language is positively related to the occupational success of immigrant groups, especially racial minorities, in the UK. Using an instrumental variables approach they find that English language ability is the second-most important factor, after education, in determining occupational status leading to higher wages.

Clark and Lindley (2005) use UK data to examine the employment and wage assimilation of immigrants to the UK with a focus on the acquisition of education. They report positive earnings assimilation for immigrants to the UK, and their findings suggest that employment assimilation is strongest for those immigrants who completed their education in the UK and then subsequently entered the job market. Differences in the returns to education for immigrants also exhibit striking differences by race. For most immigrants who acquired their education prior to entry to the UK, wage assimilation is much slower than those who acquired it in the UK after migration. In addition, in what they term the 'scarring hypothesis' Clark and Lindley find that assimilation is particularly difficult if immigrants arrive in the UK during a period of high unemployment.

3.3 Obesity and labor market outcomes

As noted in the introduction, there is a large and growing literature aimed at determining the consequences of obesity in the labor market. Obesity may cause lower wages if employers discriminate against the obese or if obesity results in lower labor market productivity. However, the obese may simply possess less desirable personality traits that affect their productivity such as laziness or a lack of social skills, traits that the general public often associates with the obese (Sobal, 2004). The obese may more heavily discount the future, making them more prone both to overeat and to invest less in wage-enhancing human capital (Zhang and Rashad, 2008; Cawley, 2004). Reverse causality is also possible such that those with lower wages become obese in part because they cannot afford healthy food and rely on calorie dense fast foods (Drewnowski, 2009). Conversely the obese, believing their marriage market prospects are low, may invest more heavily in labor market oriented human capital, and thus have higher wages (Averett and Korenman, 1996). Finally, cultural norms may play a role in whether or not there is a labor market penalty associated with obesity (Costa-Font and Gil, 2004; Garcia and Quintana-Domeque, 2007). Studies that only use OLS tend to find that the obese are penalized in the labor market in terms of both wages and employment (see e.g. Pagan & Davila, 1997; Garcia & Quintana-Domeque, 2006; Klarenbach et al., 2006), but a few find no effect (Lundborg et al., 2007; Johansson et al., 2007). These studies make use of data from the U.S. and several European countries.

The focus of much of the literature in this area has been on addressing the potential endogeneity between labor market outcomes and obesity. One strategy has been to use a lagged measure of BMI since this temporal ordering of events is less likely to reflect reverse causality (Averett and Korenman, 1996; Cawley, 2004; Conley and Glauber, 2006; Paraponaris, Saliba

and Ventelou, 2005; Sanz-de-Galdeano, 2008; Shimokawa, 2008; Tao, 2008; Huffman & Rezov, 2010; Wada and Tekin, 2010; and Gregory and Ruhm, 2011). Many of these papers report that the obese face lower wages and/or a lower probability of employment, and this is particularly true for obese women.

Sibling fixed-effects models have also been used to examine the relationship between obesity and wages on the assumption that differences between siblings remove the variation in weight attributable to a shared family environment. Using this method, these studies find some evidence of a wage penalty although often smaller than that found with OLS (e.g. Averett and Korenman, 1996; Baum and Ford, 2004). Using a sample of monozygotic twins, who share identical genes, Behrman & Rosenzweig (2001) report no effect of BMI on wages.

Individual fixed-effects models have been used to control for time-invariant individual-specific factors that might be correlated with both BMI and earnings (Baum and Ford, 2004; Cawley, 2004; Han, Norton and Sterns, 2008; Huffman and Rezov, 2010; Wada and Tekin, 2010). Cawley (2004) argues that the use of an individual fixed-effects model is superior to analyzing differences between siblings because it eliminates more variation due to unobserved non-genetic factors. To support his argument he references research that has been unable to detect any effect of common household environment on bodyweight. Yet another body of literature indicates that the family environment may be "obesogenic" in that parents shape the eating environment of their children by making food available and by their own eating habits and food choices (see Birch 1999 and citations therein for more discussion). Most of these studies also report evidence of a wage and/or employment penalty.

The method of instrumental variables is preferred to individual fixed effects if we are concerned that the important unobservable factors are time varying or that there is reverse

causality. However, finding a suitable instrument is challenging as such must be highly correlated with BMI but not correlated with the error in the wage model. Using the BMI of a biological family member as an instrument was first proposed by Cawley (2004) and since then numerous studies have employed this instrument (Cawley and Danziger, 2005; Cawley, Grabka and Lillard, 2005; Brunello and D'Hombres, 2007; Atella, Pace and Vuri, 2008; Lindeboom et al., 2009; Kortt and Lee, 2010; and Gregory and Ruhm, 2011).[4] These studies often find no effect of obesity on earnings or employment.

The use of the BMI of a biological family member as an instrument is not without its critics. The problem is that, as recognized by Cawley (2004), there exists the possibility that a substantial part of the genes responsible for obesity are also responsible for other factors that affect labor market outcomes, such as willingness to delay gratification (i.e. time discount rate). However, Norton and Han (2008) use data which contains genetic information for a subset of respondents. The authors argue that genetic information from specific genes that have been linked to obesity in the biomedical literature provides an ideal instrument for obesity because genes are a source of exogenous variation. They demonstrate that their genetic information coupled with sibling BMI is highly predictive of lagged BMI and the probability of being obese or overweight. A strength of their research is that they are able to empirically test whether the sibling BMI instrument can be legitimately excluded from the wage equation. It is not possible to test directly whether the instruments are exogenous, though in an overidentified model it is possible to test the conditional validity of the additional instruments under other maintained assumptions. They find that lagged sibling BMI does pass the test of over-identifying restrictions, a particularly important finding because so many previous studies have used sibling

[4] A number of other instruments have also been used including mean BMI in the health authority area (Morris, 2006, 2007), genetic information indicating a predisposition to obesity (Norton and Han, 2008) and parents' prescriptions for medication to treat obesity-related disease (Greve, 2008).

BMI as the sole instrument (and thus have not been able to test the over-identification restriction because they have only one instrument and the model is just identified).

However, Kortt and Lee (2010) in a review of nine studies that use instrumental variables report that there is little evidence of systematic biases in the differences between OLS and IV. Pagan and Davila (1997) conduct a Hausman test to determine if BMI is exogenous and they find evidence that it is. Finally, Lindeboom et al. (2009) report that they are "skeptical" about the use of this instrument because when they used the biological parent's obesity (mother and father) they find they cannot pass the overidentification tests leading them to conclude that these instruments are still picking up the influence of unobserved factors that are correlated with both obesity and labor market outcomes. Some recent researchers have gone so far as to state that they do not even purport to identify the causal effect of BMI on labor market outcomes given that this is a challenging task without a credible natural experiment (Garcia and Quintana-Domeque, 2006).

In the only study that examines the labor market penalty for obesity among immigrants, Cawley, Han and Norton, 2009 use the New Immigrant Survey (NIS), the first nationally representative survey of legal immigrants in US history. This is the only US data set of which we are aware that contains data on labor market outcomes and obesity for immigrants. They have a sample of 2,321 women and 2,171 men comprised solely of immigrants who are from developing countries. The top five countries of origin in their sample are Mexico, India, El Salvador, Philippines and China. They use the NIS to study four outcomes: wages, whether an individual is employed, whether the respondent suffers health related work limitations, and whether the employed respondent has a white-collar job.

The only significant association they find is that higher weight is associated with a lower probability of employment among immigrant women with a short duration of stay in the US. They report several limitations of their work that are common in this literature. They did not have longitudinal data and could not identify an instrument that could provide exogenous variation in weight, their sample size was limited, the data only have self reported weight and height, their data only included legal immigrants and some places of birth were defined by region.

There are several caveats regarding the above literature. First, in most studies height and weight are self-reported, which increases the likelihood of measurement error. There is evidence showing that this measurement error is not random, and the direction of the bias, and its extent, vary systematically with age and sex (Thomas and Frankenberg, 2000). Second, BMI has been criticized as a measure of adiposity because it does not distinguish between fat and fat-free mass such as muscle and bone (Romero-Corral et al., 2006). Burkhauser and Cawley (2008) recommend using more accurate measures of fatness such as total body fat, percentage body fat, fat-free mass, and waist circumference, and they present a method for adjusting self-reported height and weight using U.S. data. Wada and Tekin (2010) use these more accurate measures of body mass combined and find evidence that the obese suffer a wage penalty. Finally, there are also potential selection issues in both labor market status and wage equations. However, since standard selectivity correction techniques depend on specific functional form assumptions and the exogeneity of the variables of the selection equation, most studies examine the employment decision and the wage outcome in separate models.

4. Empirical Analysis of Immigrants, Obesity and Labor Market Outcomes in the UK

In this section, we present our empirical which extends that of Cawley, Han and Norton (2009). Using a similar methodology, we examine the experiences of immigrants to the UK in the years 2004 and 2006, a time when the UK labor market was relatively strong and the UK experienced a large inflow of migrants.

4.1 Description of the Data

The British Household Panel Survey (BHPS) is a nationally representative annual survey in the UK that began in 1991 with roughly 5,000 households that include over 9,000 adults. Several sub-samples have been added and removed from the survey over time: the European Community Household Panel (ECHP) from 1997 to 2001, the Scotland and Wales Extension from 1999 onward, and the Northern Ireland Household Panel Survey (NIHPS) from 2001 onward. In addition to these extensions, new members enter the survey when they join an original survey household by marriage, birth or cohabitation.

The BHPS allows us to identify immigrant status, obesity, and labor market outcomes. We use two questions to identify and categorize immigrants by country of origin and relocation duration: "Where were you born?" and "In what year did you first come to this country to live (even if you have spent time abroad)?" Both of these questions are only asked once, the first time an individual is interviewed if they report that they have not always lived at the same address and that their country of birth is not the UK. Given our limited sample, we form a parsimonious grouping of countries of origin. The countries and groups of immigrants to the UK in our sample are detailed in table 1.

The BHPS collected information on height and weight only in two waves of the data, in 2004 and 2006. Weight and height are self-reported and then used to calculate the BMI and

indicator variables for the clinical weight classifications of overweight and obesity. In keeping with Cawley, Han and Norton (2009), we conduct our analyses on four different indicators of labor market outcomes. First, we examine whether immigrants face a wage penalty or premium for being obese or overweight by looking at labor income reported for the month prior to the interview. Monthly labor income is a derived variable (fimnl) that includes income from multiple sources including overtime and self-employment. Next we look at whether or not individuals are employed (jbft), which includes both full-time (at least 30 hours per week) or part-time work. We create an indicator of work limitations from several variables in the BHPS that change during the sample period. These include direct measures of work limitations due to health or mental health conditions and more specific questions about difficulty performing work.[5] Finally, we follow Balia and Jones (2008) in deriving social classifications from the Registrar General's social classification which is based on three-digit SIC codes (jbrgsc). We use this classification because it has the fewest missing observations, though the sample size for this regression is still slightly smaller than those of the other outcome measures. The social classifications are: professional and managerial, skilled including those in the military, and semi and unskilled. A dichotomous indicator of a professional and managerial occupation is our dependent variable for the regressions on white collar work.

Our sample is restricted to respondents who report BMI data in at least one of the two waves resulting in a sample of 21,292 person-year observations from14, 493 individuals. Of these individuals, 584 are immigrants. We observe 258 of these immigrants for both waves

[5] Our indicator of work limitations is an aggregation of positive answers to questions about "health prohibits some type of work" (hlendw), "health limits type or amount of work" (hlltw) which are available in 2006 and more detailed questions about physical health limiting the amount of time spent on work, accomplishing less, limiting kinds of work and difficulty performing work (hlsf4a,b,c and d) as well as questions regarding mental health limiting work (hlsf5a,b and c) which are only available in 2004.

resulting in 842 person-year observations for immigrants with BMI information. Immigrants comprise 4.6 percent of the female sample and 3.6 percent of the male sample. This sample omits 5 observations for pregnant immigrants and 204 observations for pregnant natives because of the obvious association between pregnancy and reported weight. In addition, seven observations were deleted because of unreasonably low BMIs resulting from low reported weight. Complete summary statistics by gender and immigration status pooled for person-waves are presented in table 2.

Notable in the unadjusted summary statistics is that immigrants, both men and women, have a higher average wage and higher proportions in managerial/professional jobs than UK natives. This reflects a positive selection of immigrants to the UK consistent with the findings of Dustmann, Glitz and Vogel (2010) who analyzed data from the British Labour Force Survey from 1981 – 2005. The proportion of immigrants who are employed is similar to that of natives, although immigrant women are substantially more likely to report work limitations than native women. Also consistent with Dustmann, Glitz and Vogel, the majority of immigrants in our sample are from the West region which includes other OECD countries. The average duration spent in the UK among immigrants in our sample is high (31.55 years and 33.99 years for women and men respectively). This long duration reflects the sample construction of the BHPS which only adds individuals to the sample if they join a household of an original sample member from 1991 or are part of one of the sub-samples which are not likely to include many immigrants. That said, we do observe a range of duration from 1 – 85 years with 10% of our immigrant observations residing in the UK for less than 8 years and 5% for less than 3 years.

Female immigrants have lower BMIs on average and a lower probability of being obese than native born women, and these differences are statistically significant at the one percent

level. No other weight differences are statistically significant across immigrant status for either men or women.

The demographic variables reported in table 2 suggest that immigrants to the UK are comparable in age and family structure compared with natives although immigrants are more likely to be married. We classify education as "college or professional" which includes teaching and nursing degrees, "vocational" which includes high school and apprenticeships, and "no education" which includes those still in school. Immigrants are overrepresented in both the highest and lowest education categories. Following Cawley, Han and Norton (2009), we include variables on current smoking status and whether or not the individual reports a problem with drinking in order to account for myopic time preferences.[6] Not surprisingly, immigrants are more likely to report being racial or ethnic minorities. We report these race categories in the summary statistics, but include region of origin in the regressions to better capture the effects of immigration.[7] Wheatley Price (2001) notes that country of origin variables may also capture variations in the quality of schooling, the transferability of skills between national labor markets, average English language ability, and systematic differences in unobserved ability, determined before migration by the prevailing characteristics of the origin country. Unfortunately, our data does not include information on English language proficiency.

4.2 Healthy Immigrant Hypothesis

To examine the presence of a healthy immigrant effect among immigrants to the UK, we estimate health differentials for immigrants controlling for individual characteristics as represented in the following equation:

[6] The drinking variable available in the BHPS is limited to self-reported problem drinking which likely explains why drinking rates are low in our sample.

[7] We were unable to include both race and region because of collinearity that is exacerbated in our limited sample. We also ran our models replacing region with race. The results are similar and are available upon request.

$$H_{it} = \alpha + \beta X_{it} + \varphi IMM_i + \tau DUR_{it} + \theta Y2006_t + \varepsilon_{it} \quad (1)$$

We look at two measures of health (H_{it}): BMI and an indicator of obesity (BMI ≥ 30). *IMM* is a dichotomous variable equal to one if the respondent is an immigrant, and *DUR* is the number of years the respondent had been in the UK at the time of immigration (equal to zero if they are native born). *Y2006* is a year fixed effect. The vector *X* contains the demographic variables described above plus a quadratic age term.

The results in table 3 generally support the healthy immigrant hypothesis. The coefficient on immigrant status is negative for both BMI and the likelihood of obesity for women and men, although the effects for men are smaller and do not reach conventional levels of significance. Controlling for individual characteristics such as age and education, female immigrants have a BMI that is slightly more than 2 points lower than that of comparable natives. The lower BMI levels among female immigrants translate into obesity rates that are 10.5 percentage points lower than that of native-born women. The positive significant coefficient on the duration variable shows evidence of an assimilation effect. However, the magnitude of this coefficient is relatively small, 0.037, suggesting that while the BMIs of immigrant women begin to approach those of natives, it would take nearly 60 years (2.173/.037) for immigrant women to gain the weight associated with the higher BMI of non-immigrant women. This slow rate of assimilation with respect to weight is also reflected in a very small and insignificant coefficient on duration in the obesity regression.

We find a few interesting differences in weight associated with immigrants' region of origin. The results for immigrants from India and Pakistan are the most strongly significant and in opposite directions for men and women. Contrary to the healthy immigrant hypothesis, immigrant women from India and Pakistan have a nearly 1.1 point percentage point higher BMI

and 11.41 percentage point higher likelihood of obesity than native women in the UK. This finding is based on 72 individuals representing 101 person-year observations for female immigrants from this region. Consistent with the healthy immigrant hypothesis, men from India and Pakistan are associated with a 1.5 point lower BMI and a 5 percentage point lower probability of obesity, though the latter association is not significant at conventional levels. Other region effects include results for immigrants from Africa and South America where we observe 94 individuals for 135 person-year observations. Here we also see evidence contrary to the healthy immigrant hypothesis for men. They are associated with a relatively large (though statistically insignificant) 0.72 higher BMI and a significant 11.25 percentage point higher probability of obesity.

The associations between BMI and obesity and other covariates are in keeping with previous studies. For example, BMI and obesity increase with age at a diminishing rate. We find that neither marriage nor the presence of children is associated with significant differences in BMI or obesity. Though existing work consistently shows that BMI tends to rise after marriage, OLS models that combine the selection of thinner individuals into marriage and the impact of marriage on weight demonstrate much weaker correlations (Averett, Sikora and Argys, 2008). Lower levels of education (college professional is the omitted category) are associated with higher weight and smoking and drinking are strongly associated with lower weight for both men and women.

4.3 Labor Market Outcomes: Immigrants Only

We begin our analysis of immigration, obesity and labor market outcomes by estimating models similar to those reported by Cawley, Han and Norton (2009) on the immigrant-only sample. Our results, like those of Cawley, Han and Norton (2009), can only be viewed as

associations since we are unable to instrument for BMI and small sample and cell sizes make individual fixed-effects models infeasible. Our empirical model takes the following form:

$$L_{it} = \alpha + \beta X_{it} + \gamma OW_{it} + \eta OB_{it} + \tau DUR_{it} + \theta Y2006_t + \varepsilon_{it} \quad (2)$$

L represents one of four labor market outcomes described. We classify individuals as overweight (*OW*) and obese (*OB*) with recommended weight and underweight combined as the omitted category. We estimate log wage equations using OLS and logit models for employment, work limitations and white collar work. Estimates of equation (2) are presented in table 4 for each of our four labor market outcomes. Marginal effects are reported for logit models of employment, work limitations and white collar work.

Despite our smaller sample size, we find more significance in the effects of overweight and obesity on labor market outcomes among an immigrant-only sample in the UK than Cawley, Han and Norton (2009) found among immigrants to the US. However, beyond the different institutional settings between the UK and the US, our sample includes a large proportion of immigrants from developed countries including the US, Canada and Australia while they restricted their sample to immigrants from developing countries.

Overall, the results demonstrate a negative association between overweight and obesity and labor market outcomes for immigrants to the UK. The wage penalty effect is especially large for obese men, indicating that obese male immigrants face a wage penalty in excess of 20 percent compared to healthy weight male immigrants. The wage penalty for obese immigrant women is 13 percent, but it is not significant at conventional levels. These models also control for length of time in the U.K. Duration has a small positive effect only on the earnings of women indicating that wages for women gradually increase with duration but at a rate less than 1 percent per year.

We find a sizeable and strongly significant association between overweight and obesity and the report of health-related work limitations for immigrant women. Female immigrants who are overweight or obese are 12.4 percentage point and 18.35 percentage points more likely to report such limitations than healthy weight immigrants. For men, we find a significant difference of 11.69 percentage points for obese men only.

Finally, we find large negative associations between overweight and obesity and being in a white collar job. The associations are very similar for men and women at approximately 11 percentage points for those overweight and 17 percentage points for those obese. We do not find any significant associations with being employed.

4.4 Labor Market Outcomes: Immigrants and Natives

Since our sample includes both immigrants and natives, we can extend Cawley, Han and Norton (2009) to directly compare the immigrant and native populations with respect to the effect of weight on labor market outcomes. We do this by estimating the following equation which augments equation (2) by including an indication for immigration (*IMM*) and interaction effects between immigration and weight classifications as well as a control for duration in the UK for immigrants (this variable is 0 for natives):

$$L_{it} = \alpha + \beta X_{it} + \Gamma IMM_t + \gamma OW_{it} + \eta OB_{it} + \phi(IMM_t * OW_{it}) + \lambda(IMM_i * OB_{it}) + \tau DUR_{it} + \theta Y2006_t + \varepsilon_{it} \quad (3)$$

The key coefficients of interest are λ and ϕ, the coefficients on the interactions of immigrant and weight status. Table 5 reports the results from this analysis.

The strongest finding of these regressions is a wage penalty for overweight and obese immigrant men of 25 percent and 31 percent respectively. This wage penalty for immigrant men is in contrast to the wage premium of 6-8 percent that we find for overweight and obese native born men. The finding of a wage premium associated with overweight and obesity is

consistent with findings from other studies that have used OLS (see Brunello and d'Hombres, 2007; Morris, 2006; 2007). We find negative coefficients of 11.75 percent and 16.70 percent for overweight and obese immigrant women, but while sizeable they are not significant at conventional levels.

Turning to the probability of employment, we find that obese immigrant women experience a 9 percentage point greater probability of working. This finding is marginally significant. This stands in contrast with a strongly significant finding that obese native women are associated with a 5 percentage point lower probability of working. However, a joint f-test on the coefficients of obese and the interaction between obesity and immigrant does not reach conventional levels of significance (p=.405). We find a positive association between being overweight and working for native born women and men. One potential explanation for this finding is, as noted earlier, BMI may not be the best measure of adiposity since someone who is very muscular may be classified as overweight on the basis of BMI.

Work limitations are more prevalent among the obese for both native men and women. Notably, overweight immigrant women are 11.88 percentage points more likely to have work limitations all else equal, and this finding is strongly significant. Associations for overweight immigrant men and for obese immigrants of both genders are smaller and not statistically significant.

The last labor market outcome in table 5 is whether or not the respondent is in a professional or managerial job, which, in keeping with Cawley, Han and Norton, we refer to as "white collar." We find significant associations between overweight and obesity and white collar work for men, but not for women. Native men are less likely to be in professional or managerial jobs if they are overweight (2.3 percentage points) or obese (4.8 percentage points).

As we saw in the means, immigrants overall are more likely to be in white collar occupations. Overweight and obese male immigrants, however, are less likely to be in these jobs (-10.53 and -12.13 percentage points respectively) although the association is statistically significant only for overweight immigrants.

All of the models include indicators for the immigrant's region of origin with the West including other countries in Europe, the US, Canada and Australia as the omitted region. As noted, a majority of the immigrants in our sample come from the West, and our broad groupings were dictated in part by our limited sample size. Nonetheless, we find consistent negative associations for female immigrants from India and Pakistan across all of the labor market outcomes. The wage penalty for women from this region is estimated to be over 36 percent, second in magnitude only to the 70 percent penalty associated with having no education. This finding is based on observing 58 person-year observations for 41 female immigrants from this region. Women from India/Pakistan are 14 percentage points less likely to be working, 14.7 percentage points more likely to report work limitations, and nearly 25 percentage points less likely to be in white collar jobs. We do not find a significant wage penalty for men from India/Pakistan (31 individuals with 43 person-year observations), but we do find a strong negative association with employment and a positive but not statistically significant association with white collar work.

Briefly looking at the other covariates in the model, we find associations that are consistent with economic theory. Higher educational attainment is strongly associated with better labor market outcomes. Age is positively associated with wage, employment and white collar work, but also positively associated with the probability of reporting work limitations. We find a marriage wage penalty for women and premium for men though marriage is positively

associated with working and negatively associated with work limitations for both. Children are negatively associated with wages, working and white collar work for women, but not for men. Finally, we find a strong negative association between smoking and labor market outcomes and to a lesser extent between drinking and labor market outcomes.

5. Conclusions

In this paper we have offered new evidence on the dual effects of immigration and obesity on labor market outcomes for immigrants to the UK. We find several significant associations. First, we find evidence supporting the healthy immigrant hypothesis in that the BMI of immigrants is strongly and significantly lower than that of natives, and immigrants have a lower probability of obesity than natives. In addition, our results are consistent with other literature of immigration to the UK (e.g. Dustmann, Glitz and Vogel, 2010) in finding a wage premium and increased likelihood of working in a white collar job for male immigrants. Despite a wage premium for overweight and obese men in general, we find a wage penalty for overweight and obese immigrant men. Our findings for female immigrants are generally consistent with those for male immigrants in sign, and are often of sizable magnitude but are not significant at conventional levels. This may be due to greater selection effects associated with women's' decisions about whether or not to enter the labor market in the first place. It is important to note that our findings are associations and cannot confirm causation due to data limitations that preclude effectively addressing the endogeneity between weight and labor market outcomes. Endogeneity associated with both reverse causality and unobservable characteristics correlated with both weight and labor market outcomes is a challenge throughout the literature in this area. It is particularly challenging here because of the limited data sets that combine height, weight, immigration status and labor market outcomes with adequate sample sizes of

immigrants. Neither our data nor that used by Cawley, Han and Norton (2009) include suitable instruments, and our data has only two years for a subset of an already limited sample size precluding any reasonable fixed effects analysis. Therefore, a critical need for future research is better data over a longer time period.

Nonetheless, our findings suggest that the obesity epidemic has not spared immigrants to the UK, but that obesity has a more severe impact on labor market outcomes for male immigrants than natives. Since the UK has a National Health Service, targeted outreach to overweight and obese immigrants may have a dual effect of both lowering health care costs and increasing labor market outcomes among this vulnerable population.

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Table 1. Immigrants to the UK - British Household Panel Survey, 2004, 2006 person-year observations			
Country of Origin	**Women**	**Men**	**Total Immigrants**
Ireland	119	70	189
Historical British Colonies United States, Canada, Australia, New Zealand	47	43	90
Other Europe Cyprus, Gibraltar, Malta, Belgium, Denmark, France, Italy, Luxembourg, Netherlands, Germany, East Germany, Albania, Bulgaria, Germany, Czechoslovakia, Hungary, Poland, Romania, Austria, Switzerland, Greece, Portugal, Spain, Finland, Norway, Sweden, Yugoslavia, Turkey, USSR, Other Europe	151	81	232
India, Pakistan, Bangladesh, Sri Lanka	58	43	101
Far East Hong Kong, China, Japan, Malaysia, Singapore, Burma, Philippines, Vietnam	39	23	62
Middle East Libya, Egypt, Iran, Israel, other	12	21	33
Africa Kenya, Uganda, Tanzania, Malawi, Zambia, Zimbabwe, Botswana, Gambia, Ghana, Nigeria, Sierra Leone, Seychelles, Mauritius, Algeria, Morocco, Tunisia, South Africa, Other Africa	46	56	102
Caribbean & Americas Barbados, Jamaica, Trinidad & Tobago, W. Indies, Other Caribbean, Belize, Guyana, Central America, South America	21	12	33
Unique Person observations	341	243	
Total obs. (person years)	493	349	842

Table 2: Summary Statistics

	Women		Men		Total
Variable	Immigrants	UK Natives	Immigrants	UK Natives	
Weight indicators					
BMI	25.71	26.36	26.58	26.35	26.34
	(4.91)	(5.29)	(3.86)	(4.36)	(4.86)
Underweight	2.84%	1.92%	0.57%	0.73%	1.38%
Recommended weight	45.44%	43.18%	36.40%	40.33%	41.82%
Overweight	35.70%	33.72%	45.27%	41.77%	37.63%
Obese	16.02%	21.18%	17.77%	17.17%	19.18%
Labor market indicators					
Monthly Wages (£)	1,346.85	1,193.49	2,173.66	1,891.34	1,568.37
	(1,112.95)	(1,293.23)	(1,716.33)	(1,430.14)	(1,414.17)
Working (full or part time)	53.35%	54.35%	67.91%	67.82%	60.70%
Health limits work	34.89%	29.00%	22.64%	20.96%	25.36%
Managerial/Professional	50.38%	37.50%	56.54%	38.61%	38.68%
Skilled/Millitary	33.33%	42.49%	30.38%	43.82%	42.76%
Unskilled	16.28%	20.00%	13.08%	17.58%	18.57%
Demographic variables					
Age	49.91	47.37	49.61	45.93	46.81
	(17.27)	(18.61)	(17.06)	(18.25)	(18.42)
Number of children	0.55	0.52	0.55	0.47	0.50
	(1.02)	(0.91)	(0.96)	(0.89)	(0.91)
Married	54.16%	50.82%	67.34%	55.31%	53.22%
College/professional degree	51.32%	37.11%	53.58%	42.94%	40.37%
High school/vocational degree	21.10%	37.23%	22.06%	36.18%	36.13%
No education/still in school	25.56%	23.92%	22.92%	18.38%	21.41%
Smoker	17.64%	25.14%	31.23%	25.33%	25.15%
Drinker	0.20%	0.41%	1.15%	0.76%	0.52%
Duration in the UK	31.55	n/a	33.99	n/a	n/a
	(18.42)	n/a	(17.12)	n/a	n/a
From the West	64.30%	n/a	55.59%	n/a	n/a
From the East	10.34%	n/a	12.61%	n/a	n/a
From India/Pakistan	11.77%	n/a	12.32%	n/a	n/a
From Africa/ S.America	13.59%	n/a	19.48%	n/a	n/a
White	77.45%	98.78%	76.22%	98.27%	97.69%
Black	4.46%	0.43%	4.30%	0.55%	0.64%
Asian	17.65%	0.51%	18.05%	0.74%	1.30%
Other race	7.71%	0.28%	7.16%	0.48%	0.66%
N (person-waves)	493	10,730	349	9,720	21,292

Standard deviation for continuous variables in parentheses

Table 3. Immigration and Weight

Full Sample of Immigrants and Natives

Dependent Variable	BMI		Obesity (BMI ≥30)	
Gender	Women	Men	Women	Men
Immigrant	-2.1732***	-0.4520	-0.1051***	-0.0724
	(0.411)	(0.472)	(0.027)	(0.048)
Duration in the UK	0.0371***	0.0182	0.0007	0.0018
	(0.010)	(0.011)	(0.001)	(0.001)
India/Pakistan	1.0993*	-1.5340***	0.1141*	-0.0542
	(0.600)	(0.586)	(0.061)	(0.052)
East/Asia	-0.0914	-0.7190	0.0363	-0.0125
	(0.703)	(0.529)	(0.056)	(0.061)
Africa/S.America	-0.3461	0.7179	-0.0228	0.1125*
	(0.561)	(0.638)	(0.041)	(0.060)
No education	1.7015***	0.5458***	0.1157***	0.0623***
	(0.155)	(0.137)	(0.012)	(0.012)
High school/vocational	0.9211***	0.3391***	0.0564***	0.0293***
	(0.112)	(0.097)	(0.009)	(0.009)
Smoker	-0.9450***	-0.8963***	-0.0416***	-0.0533***
	(0.117)	(0.099)	(0.009)	(0.008)
Drinker	-1.4857*	-1.7011***	-0.0104	-0.0521
	(0.878)	(0.528)	(0.060)	(0.037)
Age	0.3094***	0.3329***	0.0149***	0.0166***
	(0.015)	(0.013)	(0.001)	(0.001)
Age squared	-0.0028***	-0.0031***	-0.0001***	-0.0002***
	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.0820	0.1523	0.0038	-0.0016
	(0.114)	(0.106)	(0.009)	(0.010)
Children	-0.0238	0.3100***	-0.0065	0.0066
	(0.118)	(0.112)	(0.009)	(0.010)
Year 2006	2.0520***	0.5367***	0.1099***	0.0260***
	(0.101)	(0.084)	(0.008)	(0.008)
Constant	17.6120***	18.3210***	-0.2142***	-0.2122***
	(0.312)	(0.275)	(0.022)	(0.022)
Observations	11,013	10,069	11,013	10,069
R-squared	0.110	0.103	0.048	0.031

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

Obesity is a logit regression with marginal effects reported

Table 4. Marginal Effects of Weight on Labor Market Outcomes

Immigrants Only Sample

Dependent Variable	ln Wages		Working		Work Limitations		Professional/Managerial	
Gender	Women	Men	Women	Men	Women	Men	Women	Men
Overweight	-0.0818	-0.1612	0.0453	-0.0254	0.1240***	-0.0151	-0.1103*	-0.1184*
	(0.111)	(0.120)	(0.044)	(0.042)	(0.045)	(0.047)	(0.061)	(0.061)
Obese	-0.1304	-0.2129*	0.0505	-0.0045	0.1835***	0.1169**	-0.1743*	-0.1612*
	(0.147)	(0.118)	(0.051)	(0.055)	(0.058)	(0.057)	(0.089)	(0.083)
Duration in the UK	0.0081*	-0.0065	0.0003	-0.0006	0.0001	-0.0008	0.0034	-0.0031
	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
East	0.2831**	-0.0434	0.0115	0.0123	0.0742	-0.0466	-0.0461	-0.0066
	(0.132)	(0.197)	(0.065)	(0.073)	(0.064)	(0.072)	(0.075)	(0.083)
India/Pakistan	-0.3454	0.0317	-0.1278**	-0.1310**	0.1905***	0.0907*	-0.2624***	0.1615
	(0.215)	(0.184)	(0.052)	(0.054)	(0.061)	(0.054)	(0.093)	(0.110)
Africa/S.America	0.0127	0.1191	0.0499	-0.0965**	0.0966	-0.1353*	0.0382	-0.0241
	(0.149)	(0.141)	(0.053)	(0.046)	(0.063)	(0.078)	(0.073)	(0.073)
No education	-0.4543***	-0.5896***	-0.2141***	-0.2028***	0.0724	0.0953*	-0.4881***	-0.4858***
	(0.171)	(0.187)	(0.047)	(0.049)	(0.054)	(0.054)	(0.119)	(0.104)
High school/vocational	-0.2001*	-0.2856**	-0.0410	0.0053	0.0111	0.0214	-0.2680***	-0.3025***
	(0.113)	(0.126)	(0.041)	(0.047)	(0.050)	(0.048)	(0.060)	(0.055)
Smoker	-0.0518	-0.1882*	-0.0071	-0.0610*	0.1443***	0.0525	-0.1908**	-0.2002***
	(0.150)	(0.110)	(0.048)	(0.035)	(0.052)	(0.044)	(0.077)	(0.060)
Drinker	-1.1212***	-0.0552		0.0938		0.3142*		0.4522
	(0.170)	(0.165)		(0.095)		(0.165)		(0.318)
Age	0.1082***	0.1101***	0.0381***	0.0389***	0.0039	-0.0164**	0.0246*	0.0429***
	(0.040)	(0.020)	(0.010)	(0.008)	(0.007)	(0.007)	(0.014)	(0.012)
Age squared	-0.0015***	-0.0012***	-0.0006***	-0.0005***	0.0000	0.0002***	-0.0003	-0.0004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.2346*	-0.0427	0.0201	0.0709	-0.0183	0.0645	0.098	-0.1280*
	(0.125)	(0.133)	(0.040)	(0.053)	(0.044)	(0.054)	(0.060)	(0.077)
Children	-0.4008***	0.0192	-0.0772***	-0.0142	-0.0480*	-0.0126	-0.0693**	0.0044
	(0.067)	(0.069)	(0.018)	(0.023)	(0.025)	(0.027)	(0.033)	(0.034)
Year 2006	0.0531	0.1568	0.0503	-0.0270	-0.0717*	-0.0357	0.1297**	0.046
	(0.102)	(0.106)	(0.037)	(0.035)	(0.041)	(0.042)	(0.058)	(0.058)
Constant	5.2628***	5.4493***						
	(0.796)	(0.408)						
Observations	259	237	493	349	493	349	259	237
R-squared	0.250	0.166						

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

Work, Limits and Professional/Managerial are logit regressions with marginal effects reported

Drinker was dropped due to collinearity in small samples for Women in the logit regressions

Table 5. Marginal Effects of Weight on Labor Market Outcomes

Full Sample of Immigrants and Natives

Dependent Variable	ln Wages		Working		Work Limitations		Professional/Managerial	
Gender	Women	Men	Women	Men	Women	Men	Women	Men
Overweight	0.0316	0.0592***	0.0177**	0.0217***	0.0124	0.0096	0.0056	-0.0226*
	(0.023)	(0.020)	(0.009)	(0.008)	(0.010)	(0.009)	(0.014)	(0.013)
Obese	0.0199	0.0759***	-0.0503***	-0.0148	0.1090***	0.0643***	-0.0135	-0.0479***
	(0.028)	(0.026)	(0.010)	(0.010)	(0.011)	(0.011)	(0.016)	(0.016)
Immigrant	-0.0196	0.1818	-0.0184	0.0363	-0.0509	0.0469	0.0015	0.1866**
	(0.112)	(0.128)	(0.042)	(0.062)	(0.049)	(0.052)	(0.063)	(0.074)
Immigrant*Overweight	-0.1175	-0.2514**	0.0203	-0.0359	0.1188***	-0.0262	-0.0799	-0.1053*
	(0.114)	(0.117)	(0.042)	(0.054)	(0.043)	(0.047)	(0.063)	(0.064)
Immigrant*Obese	-0.1670	-0.3092***	0.0907*	0.0029	0.0757	0.0371	-0.1213	-0.1213
	(0.152)	(0.117)	(0.050)	(0.066)	(0.054)	(0.060)	(0.090)	(0.083)
Duration in the UK	0.0046	-0.0004	-0.0005	0.0014	0.0004	-0.0009	0.0047**	-0.0001
	(0.003)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
East	0.2308	-0.1332	-0.0012	0.0014	0.0674	-0.0662	-0.054	-0.0083
	(0.142)	(0.187)	(0.062)	(0.078)	(0.060)	(0.069)	(0.083)	(0.078)
India/Pakistan	-0.3630**	-0.0025	-0.1402***	-0.1651***	0.1474***	0.0782	-0.2484**	0.1369
	(0.184)	(0.180)	(0.051)	(0.064)	(0.056)	(0.057)	(0.104)	(0.112)
Africa/S.America	-0.0722	0.0938	0.0447	-0.1014*	0.0863	-0.1592**	0.0278	0.0069
	(0.149)	(0.133)	(0.053)	(0.053)	(0.057)	(0.070)	(0.073)	(0.071)
No education	-0.7031***	-0.4479***	-0.1916***	-0.1112***	0.0713***	0.0856***	-0.5149***	-0.3293***
	(0.039)	(0.036)	(0.011)	(0.011)	(0.013)	(0.011)	(0.029)	(0.020)
High school/vocational	-0.2771***	-0.2295***	-0.0469***	-0.0086	0.0124	0.0189*	-0.2833***	-0.2282***
	(0.023)	(0.020)	(0.009)	(0.008)	(0.011)	(0.010)	(0.010)	(0.011)
Smoker	-0.0661***	-0.0278	-0.0473***	-0.0546***	0.0824***	0.0606***	-0.0454***	-0.1063***
	(0.022)	(0.020)	(0.008)	(0.008)	(0.010)	(0.009)	(0.014)	(0.013)
Drinker	0.2688	-0.0404	-0.2645***	-0.2603***	0.3598***	0.2361***	0.1672*	0.0369
	(0.344)	(0.185)	(0.063)	(0.035)	(0.062)	(0.036)	(0.095)	(0.112)
Age	0.1712***	0.1457***	0.0519***	0.0400***	0.0021	0.0026**	0.0342***	0.0316***
	(0.006)	(0.005)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
Age squared	-0.0021***	-0.0017***	-0.0007***	-0.0005***	0.0000***	0.0000***	-0.0004***	-0.0003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	-0.1111***	0.0801***	0.0346***	0.0632***	-0.0394***	-0.0306***	-0.0260**	0.0115
	(0.022)	(0.021)	(0.009)	(0.009)	(0.009)	(0.009)	(0.013)	(0.014)
Children	-0.2204***	0.0084	-0.0948***	-0.0011	0.0073	-0.0034	-0.0195***	-0.0002
	(0.013)	(0.010)	(0.004)	(0.005)	(0.005)	(0.005)	(0.007)	(0.007)
Year 2006	0.0721***	0.0750***	-0.0037	0.0054	-0.0875***	-0.0331***	0.0083	0.0087
	(0.021)	(0.018)	(0.008)	(0.007)	(0.009)	(0.008)	(0.012)	(0.011)
Constant	3.9837***	4.4890***						
	(0.117)	(0.099)						
Observations	6,012	6,803	11,013	10,069	11,013	10,069	5,959	6,842
R-squared	0.226	0.246						

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

Work, Limits and Professional/Managerial are logit regressions with marginal effects reported