BANCA D'ITALIA

Temi di discussione

del Servizio Studi

Production or consumption? Disentangling the skill-agglomeration connection

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Number 571 - January 2006

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PRODUCTION OR CONSUMPTION?
DISENTANGLING THE SKILL-AGGLOMERATION CONNECTION

by Guido de Blasio*

Abstract

To explain the concentration of human capital in cities, urban theory conjectures that the metropolitan scale provides two sources of returns for the more educated: production benefits, both in terms of wages and non-monetary gains, and consumption benefits. By exploiting a unique survey on Italian workers that records information for the two sources of returns, this paper quantifies their respective roles. The findings show that skilled workers enjoy higher consumption amenities in larger cities. They benefit from the local public goods, such as transportation, health and schooling services, the shopping possibilities, and the cultural consumption potentials made possible by the urban location of cinemas, theaters, and museums. On the other hand, the more educated do not receive benefits on the production side. Their wages do not reflect a premium, and the returns to education and experience are not higher than elsewhere. Moreover, urban skilled workers do not change jobs more readily than elsewhere and do not appear to be more satisfied of their jobs. The estimates imply that in the largest metropolitan areas the value of the consumption amenities can be as high as 50% of the rents or 16-17% of the wages.

JEL Classification: cities, human capital.
Keywords: R0

Contents

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1. Introduction[1]

The distribution of human capital is geographically uneven. Urban areas tend to have a better educated workforce than rural areas. To explain the skill-agglomeration connection theory has suggested various mechanisms. If cities speed the flow of information (Lucas (1988)), this can be more valuable to individuals who have high human capital. Urban areas may also offer other labor market advantages, in terms of better matches or lower unemployment risk (Glaeser (1998)). Alternatively, cities may be centers of consumption (Glaeser et al (2001)), which cater to the rich.

To aim of this paper is to gauge the respective roles of these explanations. To do this, I exploit a unique dataset on Italian workers, which provides information on both production– and consumption–related urban benefits. On the production side, the data allow me to investigate – besides the wage benefits (Glaeser and Maré (2001)) –, the non-wage advantages of urban agglomeration (Rosenthal and Strange (2004)) both in terms of mobility across occupations and job quality. On the consumption side, I analyze individual evaluations of the local quality of life, which according to Shapiro (2003) and Tabuchi and Yoshida (2000) is a key source of agglomeration. Moreover, I study the role played by the elementary components (such as public goods, pollution, or cultural amenities) of the quality of life at the local level.

The findings show that the skill-agglomeration connection is mainly explained in terms of consumption benefits. Skilled workers enjoy higher amenities in larger cities. In particular, they seem to enjoy the local public goods – such as transportation, health and schooling services –, the shopping possibilities and the cultural consumption potentials made possible by the urban location of cinemas, theaters, and museums. On the other hand, the more educated do not seem to receive benefits on the production side. Their wages do not reflect a premium, and the returns to education and experience do not seem to be higher than elsewhere. Moreover, there is no evidence of non-wage benefits. Urban skilled workers do not change jobs more readily than elsewhere. In addition, they do not appear to be more

[1] I thank Luigi Cannari and Massimo Omiccioli for stimulating discussions and participants in the European Regional Science Association (Amsterdam 2005), Associazione Italiana degli Economisti del Lavoro (Rome 2005), and two anonymous referees for comments and suggestions. I am grateful to Diego Caprara for the editorial assistance.

satisfied of their jobs. I also estimate that the extra rent costs for urban dwellings are substantial. The estimates imply that in the largest metropolitan areas the value of the consumption amenities for the more skilled can be as high as 50% of the rents or 16-17% of the wages.

In what follows, the next section highlights the relevant theoretical issues. Section 2 describes the data. The estimation of the urban rent differentials is in Section 3, while the production and the consumption urban benefits are the focus respectively of Section 4 and Section 5. Section 6 concludes.

2. Theory

The concept of spatial equilibrium represents an useful guide for the empirical analysis of the skill-agglomerations connection. Pioneered by Roback (1982) and popularized in the skill-agglomeration literature by Rauch (1993), the concept of spatial equilibrium requires individuals be indifferent across locations. Since cities affect both productivity and the quality of life (amenity), a spatial equilibrium requires the sum of the two effects be capitalized in housing rents. In particular, the following equation must hold in equilibrium:

(1) Urban Rent Premium = Urban Production Premium + Urban Consumption Premium.

This equation suggests that the Urban Rent Premium provides an upper limit against to which evaluate the benefits for skilled workers deriving from dwelling in a large city. To be sure, the Urban Rent Premium is equal to the net benefits, since offsetting productivity and amenity effects can be simultaneously at work.[2]

Theory highlights several mechanisms trough which the size of a city can impact on the productivity of the more skilled. Traditional urban theory stresses factors such as better access to specialized inputs and lower transportation costs for suppliers and customers, which may not have a skill bias. However, the human capital externalities explanations pioneered by Lucas (1988), Rauch (1993) and Ciccone and Hall (1996) suggest that the more educated workers may benefit more from urban areas because the more educated are better

[2] For instance, the view that cities are characterized by agglomeration economies in production and disamenities in consumption would lead to an Urban Rent Premium smaller than the Urban Productivity Premium.

able to learn from others.[3] While the Urban Productivity Premium is commonly measured with wages (Glaeser and Maré (2001)), worker benefits do not need to be limited to compensations. In particular, workers should be better matched in large cities (Rosenthal and Strange (2004)). A large number of employers within an urban area enables workers to change jobs more easily. This provides advantages for those trying to find the right career for themselves, since they can hop jobs at much less cost than elsewhere. A related advantage is given by the specialization made it possible by market size. In this vein, Baumgartner (1988) shows that physicians perform a narrower range of activities in large markets. To the extent that the more educated care more about the quality of their job, better matches can help to rationalize the skill-agglomeration connection. For instance, Costa and Kahn (2000) suggest that cities offer a resolution to the dual career problem of the college educated couples by increasing the probability that both partners are able to find jobs that are matched to their abilities.[4] Furthermore, cities may also offer *complementary* job opportunities. For instance, Glaeser (1998, p. 146) discusses the theater industry in new York and explains that "New York's actors not only have a wide range of different theaters to get the job, but also have numerous other employers outside of the theater industry. Indeed, the aspiring actor working in a restaurant is so common that it has became a cliché."

In contrast to the more traditional analysis of agglomeration that has focused on the ability of cities to enhance productivity, recent work has emphasized the consumption possibilities of large cities as source of agglomeration.[5] Do amenity valuations vary for skilled and unskilled? To be sure, conventional urban economics (see, for instance, O' Sullivan (2003)) has stressed the disamenities of large metropolitan areas, such as pollution and crime. Urban disamenities can hardly explain the crowding of the more educated in large cities: even though disamenities affect everyone, there are reason to believe that more

[3] More recently, this point has been questioned: Ciccone and Peri (2002) and Moretti (2003) argue that the effect of human capital externalities is more pronounced for the relatively unskilled, whose wages, in addition to the externalities, benefit also from imperfect substitutability between skilled and unskilled labor.

[4] This argument is however contended by Compton and Pollak (2004), who show that all college educated, married and unmarried, are attracted to the amenities and high returns to education found in large cities and that, as a result, the formation of power couples is more likely to occur in large cities.

[5] The importance of consumption as source of agglomeration has also been the focus of the papers by Glaeser and Saiz (2003), Shapiro (2003), and Tabuchi and Yoshida (2000), which are based however on the comparison between rents and wages (either in levels or growth rates) and therefore do not consider non-wage urban benefits. Adamson et al (2004) show that returns to education for the skilled decline with the urban scale, and interpret this finding as implying that urban amenities affect primarily skilled workers.

educated workers dislike disamenities relatively more than less educated counterparts. Recent papers have however argued that large cities enhance consumption. By looking at the radio listening patterns and newspaper purchases, Waldfogel (2003) and George and Waldfogel (2003) show that large markets allow goods to be tailored to the consumers' preferences. Glaeser et al (2001) argue that there are four ways in which city size affect consumption. First, there could be goods and services, such as opera and restaurants, which are available in large cities and not available elsewhere. Second, large cities may offer aesthetic and physical attractions, such as architecture or climate. Third, large cities may allow the provision of public goods that would not be possible in a smaller place (for instance, specialized schools). Fourth, large cities allow social interactions that that would not be possible in a smaller city. Again, it is important to note that these amenities are likely to be normal (or even luxury) goods. Thus, high-human capital individuals are likely have a stronger preference for them (see, also, Brueckner et al (1999)).

3. Data

Our main data source is the Survey of Household Income and Wealth (SHIW). This survey is conduced every two years by the Bank of Italy on a representative sample of about 8,000 households: see Brandolini and Cannari (1994) for details.[6] The SHIW collects detailed information on Italian households. For each member of the family, it gathers data on demographic features and economic behavior including wage, age, sex, marital status, work status, schooling, work history, and employer's branch of activity. Moreover, at the household level, the survey collects data on dwellings, including both the main family's house of residence and other property owned. For each dwelling, the SHIW collects several characteristics: rent, surface, location, year of construction, and additional information such as number of bathrooms and presence of a heating system. Since from 1993 the SHIW has maintained the same structure, I pool data from the last four waves (1993, 1995, 1998, and 2000). The details of the variables used in the paper are reported in the Appendix 1. The dataset includes 27,931 dwelling's observations and 23,371 wage and salary worker's

[6] SHIW micro-data are publicly available at www.bancaditalia.it. Occasionally, I use variables that for confidentiality reasons are made available only to the staff of the Bank of Italy. When used, these variables are explicitly flagged in the text.

observations (the sample is restricted to workers of age between 15 and 65). Table 1 gives the means and standard deviations for the variables used in the paper.

An important feature of the SHIW is the fact that the standard information on demographic and economic aspects, which are recorded regularly every wave and are similar to those collected by other surveys such as the American PSID or CPS, are supplemented by special sections. These sections gather subjective data on aspects that are somewhat less ordinary in conventional economic surveys (such as, individual expectations or cultural preferences).[7] Below, I exploit the 1995 special section on job satisfaction and the 1993 special section on the local quality of life.

Dwellings and workers are distributed over 380 cities. The measure for city size made available by the SHIW is a categorical variable that provides a division of municipalities by resident population in five groups: Villages (up to 5,000 inhabitants); Large Villages (from 5,000 to 20,000 inhabitants); Small MAs (from 20,000 to 50,000 inhabitants); Midsize MAs (from 50,000 to 200,000 inhabitants); and Large MAs (more than 200,000 inhabitants). In the regressions below the categorical variable for city size is transformed in a series of dummies, one for each category, where the omitted dummy corresponds to the Village group. Appendix 2 reports the names of the cities included in the sample for the two largest groups of Midsize and Large MAs. All regressions are based on appropriate weighted data.[8]

While the skill-agglomeration connection is well documented phenomena for many countries, its extent in the Italian case is quite striking.[9] As shown in Fig. 1 for the SHIW sample of workers, the college share (% of workers with a college degree or more) increase rapidly with city size. It rises from 5% in Villages and Large Villages to 20% in Large MAs.

[7] The special sections are considered to be quite demanding for the respondents and very expensive for the Bank of Italy. This explains why special sections are not recurrent and are usually posed only to a subset of the respondents.

[8] Our coefficient estimates however are not sensitive to weighting or not weighting the data.

[9] According to the evidence summarized by Adamson et al (2004), high-school share and college share in the U.S. are respectively equal to 56% and 13% in non-metropolitan areas and 54% and 22% in metropolitan areas.

Similarly, the high school share (% of workers with an high school diploma and less than a college degree) increases from 40% to 44%.[10]

4. Rents

I start by estimating the Urban Rent Premium that provides a measure of the overall net magnitude of productivity and amenity benefits. Column 1 of Table 2 reports the effects of city size on house rents controlling for nothing than time dummies. The dependent variable is the log of annual rents.[11] This regression suggests that raw differences in house rents are quite pronounced. Compared to Villages, rents are 26% higher in Midsize MAs and 45% higher in Large MAs.

Clearly, the heterogeneity in house characteristics across cities is what might drive the observed raw differences. To control for observable house features, Column 2 includes a number of standard regressors (see, for instance, Berger et al. (2003) or Gyourko et al. (1999)): the surface area and the age of the dwelling, and dummies for the presence of two bathrooms and heating system. The regression also includes a set of dummies for the location of the dwelling within the city. The SHIW classifies location by six categories: isolated area, countryside; town outskirts, between outskirts and town center, town center, other, hamlet. Finally, a dummy for families residing in the south of Italy is included.[12] The

[10] In principle, cohort composition effects might be the cause of the concentration of skilled workers in the Italian cities. The Italian population is characterized by a long-run trend of increasing education, since the younger cohorts are better-educated than the older ones. Therefore, to the extent that younger cohorts are more urbanized, the concentration of human capital in cities could be only the consequence of a younger urban workforce. However, this does not happen to be the case. By limiting the sample to younger workers (identified as those with age less than 40), I find that the high-school share and the college share increase respectively from 46% and 5% in Villages to 50% and 18% in Large MAs. Another concern is related to the role of the government. Alesina et al. (2001) argue that public employment in Italy is used mainly as redistribution device and that this distorts the functioning of the labor market. In particular, since public jobs are more attractive than private sector jobs, educational choices are tilted toward the public sector. In this vein, the concentration of human capital in large cities can be explained by the fact that these areas are predominantly home of government headquarters, both at the central and local level. The data, however, do not support the idea that the government employment explains the skill-agglomeration connection. For instance, by limiting the wage and salary sample to private sector workers, I find that the human capital concentration is even more evident: high-school and college shares are respectively equal to 35% and 2% in Villages and to 44% and 12% Large MAs.

[11] The interviewed can be either the property owner or the tenant. In the first case, the SHIW collects the rent the owner charges (or, if the dwelling is not rented or it is the family residence, her best estimate for the rent she could charge). In the second case, the tenant reports the actual rent.

[12] As well known, the south of Italy differs from the center-northern territories in a number of respects: the south is generally poorer and less endowed with infrastructures. The south has also lower quality of local

effects of these variables on rents are as expected: rents are higher for larger and newer houses and for dwellings endowed with more than one bathroom and heating system. Location dummies enter with high significance: compared with dwellings located in the countryside, rents for the houses in the town center are 27 percent higher (point estimates not reported in the table). The south dummy is associated with a 30% discount on rents. As for the coefficients of interest, I find that by controlling for observed house features the differences in rents across cities of different size are magnified. Urban rent premium are now equal to 29% for Midsize MAs and 50% for Large MAs.

Unobservable house and neighborhood characteristics might bias these estimates. For instance, larger cities might display higher house quality even after controlling for surface, age, bathrooms and heating. Similarly, larger cities might have suburbs of superior quality. To make a first cut at this issue, note that in the SHIW the interviewed is asked to provide her own evaluation regarding the quality of both the house and its location. In the first case, she has to answer to the question "How do you rate this dwelling" by picking one of the following answers: luxury, upscale, mid-range, modest, low-income, very-low income. In the second case, the question is "How do you rate the area in which this dwelling is located?" and the potential answers are recorded respectively as: upscale, run-down, neither upscale or run-down, other. The two subjective measures are clearly correlated with the observable characteristics of the houses and their location, which represent our standard controls in Column 2. This implies that their inclusion will reduce the coefficients on the observables. However, the two individual ratings are also likely to be correlated with unobservable house and location characteristics. Thus, the inclusion of the two subjective ratings can provide a robustness check for the effect of city size with respects to these unobservable features. Adding the two subjective ratings (Column 3) increases the explanatory power of the regression from 39% to 49%. As expected, the two ratings are highly significant and their inclusion reduces the estimated effects of the observables. More importantly, however, the change in the coefficients for the city size is very small[13].

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institutions and property right protection. To make sure that city size dummies are not just picking up differences between center-north and south of Italy, I control for the southern location of the dwellings.

[13] The inclusion of subjective house ratings reduces the rent samples respectively to 27,904 observations. As I checked, this reduction is not relevant for the results obtained before.

Summing up, the Urban Rent Premium is rapidly increasing in the size of the city. Residents of Midsize and Large MAs pay extra rents of respectively 30% and 50% more. Next task will be to find what are the advantages of larger cities for the more educated that compensate for these extra costs.

5. Production

As underscored in the theoretical section, urbanization economies may impact on both monetary and non-monetary aspects of the employment relationship. Below, we consider the two potential source of urban benefits in turn.

5.1 Wages

In their seminal contribution, Glaeser and Maré (2001) find that workers in cities earn a substantial premium (33%) over their non-urban counterparts. How much is the urban premium for the Italian workers? Is being in a city more valuable for the more educated? The estimation procedure involves no more than estimating versions of the basic wage equation. Table 3 presents the results for individual log earning (hourly wage rate) as the dependent variable. In the Column 1, I start by showing that there are raw wage variations among residents of differently sized cities. The wage premium for Midsize and Large MAs amount respectively to 9% and 15%.

Next, I check to what extent raw differences are due to observed differences in workers' attributes. The specification in Column 2 includes the standard Mincerian set of individual characteristics: labor market experience,[14] its squared value, number of years of schooling, and two dummies for sex and marital status. Similarly to the rent-equation, the specification includes also a dummy for workers residing in the south. The results are in line with what is usually obtained in this kind of exercise (for previous studies based on the SHIW: see Cannari and D'Alessio (1995) and Colussi (1997)). I find that high-school

[14] The measure of work experience is calculated as the difference between worker's age at the survey date and the age when the first job was taken. Thus, this measure of experience is more accurate than the most widely used measure of seniority (*Experience = Age - Years of Schooling – 6*), which attributes "waiting unemployment" after school to work experience. Workers who did not report their age when taking the first job are therefore dropped from the sample.

diplomats and college graduates earn respectively 45.7% and 81.4% more than workers with at most an elementary school qualification. Experience increases wages up to 40 years of experience. Wages of women are 8.7 percent lower than men's wages. Married workers enjoy an 8.1 percent premium.[15] Southern workers suffer from a 8.8 percent discount. Crucially, by controlling for workers' attributes the effect of city size on wages vanishes: none of the city size dummies remains significant. This suggests that the raw urban wage differentials are entirely explained by observable differences in workers characteristics among cities of different size.

To be sure, the results in Column 2 underscore that controlling for observable characteristics eliminates the average urban wage premium. That is, the premium across education levels. It could be still the case that the city size effect is positive for the more educated and negative for the less skilled, making the average urban premiums vanishing. To check for this possibility, Column 3 allows interaction between metropolitan area residence and workers' observables. I do not present the estimates of the interactions for all the four city size groups because of the preponderance of coefficients that this would create. Column 3 focuses on the interactions of workers' characteristics with Midsize and Large MAs.[16] I find that the interaction terms are never significant. In particular, in the larger urban areas high education is not rewarded more than elsewhere (the point estimates for the interactions between urban residence and college achievement are even negative). On related grounds, I do not find cross effects between work experience and urban status.[17]

Subsequently, I turn to robustness.[18] A first check is related to the inclusion of additional sets of individual controls, which refer to the worker's branch of activity, employer's size and job qualification.[19] In principle, it is debatable whether to include or not

[15] A wage premium on marriage status is common in the labor literature. For some alternative explanations of this finding see, for example, Korenman and Neumark (1991) and Loh (1996).

[16] The results reported in the text are however nicely confirmed when I allow for interactions with all the city size groups.

[17] Glaeser and Maré (2001) find that the urban wage premium increases with experience and interpret this result as suggesting that cities make workers more productive.

[18] For the sake of brevity, these set of results are not reported (they are however available on request).

[19] In particular, I include seven industry dummies for eight branches of activity (agriculture; manufacturing; building and construction; wholesale and retail trade, lodging and catering services; transport and communications; services of credit and insurance institutions; real estate and renting services, other professional, business activities; general government and other private and public services). I also add six

these controls. On the one hand, these additional controls take care of some of the unobservables. On the other hand, to the extent that the additional controls are likely to be determined simultaneously with the labor market outcome - their inclusion can lead to an underestimation of the true differences among areas (Duranton and Monastiriotis (2002)). In any case, I find that controlling for industries, firm sizes, and job qualifications has no effect on the estimates of the urban wage premiums.[20] Another concern is the extent to which my results are driven by spatial sorting. For instance, the absence of correlation between city size and earning could be explained by the fact that workers with worse unobserved abilities are more likely to dwell in large cities. To tackle this issue, I use the confidential SHIW data on the birthplace of workers. This information is at the level of the 103 Italian Provinces that cover the country. While this is certainly not ideal, I should still be able to detect spatial sorting through the different outcomes for those who work where they were born (the 'stayers') and the others (the 'movers').[21] By including an additional set of controls for movers/stayers to the specification reported in Table 3, I find, however, that spatial sorting is not an issue. The average urban premium remains non-significant for both groups. Similarly, the interactions of workers' characteristics with Midsize and Large MAs remain non-significant for both movers and stayers.

I then check how sensitive are my results to changes in the city size groping. In this respect, I first separate the largest cities (Rome, Milan, Naples, Turin, Genoa, and Palermo, which have more than 500,000 inhabitants) from the remaining Large MAs. Next, I replace the set of dummies for city sizes with the (log) of residing population. Finally, I substitute the size of the city with the size of the local labor market area, which is a functional region related to its local labor market defined in terms of commuting conditions (OECD (2002)).[22] I find that none of these additional checks modifies my results.

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dummies for seven classes of employer's size (up to 4; from 5 to 19; from 20 to 49; from 50 to 99; from 100 to 499; 500 or more; not applicable - public-sector employee). Finally, I include three dummies for the individual job qualification (for the following four categories: blue-collar worker or similar; office worker or school teacher; junior manager cadre; manager, senior official).

[20] This is true irrespectively of the fact that the additional sets controls are introduced simultaneously or one by one.

[21] A similar procedure is followed by Charlot and Duranton (2004).

[22] The log of the residing population is calculated on the basis of the data provided by the Italian National Statistical Agency (ISTAT). For the robustness to city size grouping I have used the municipality code that is SHIW confidential information.

In conclusion, the idea that the urban scale affects wages does not receive empirical support. More importantly, the idea that the more educated workers benefit more from urban areas is not supported by the evidence.

5.2 Non-wage benefits

High skilled workers may concentrate in large cities even if the firms located in these areas do not pay more. In particular, workers in urban areas can take advantage of the larger pool of employers.

As shown in the theoretical section, a central theme of the agglomeration literature is that in urban centers workers can more readily than elsewhere change jobs. Marshall suggests that thick labor market insure workers against firm- or industry-specific shocks. I investigate this idea by looking at the turnover rate, which is measured in the SHIW by the question: "Consider all the activities, including temporary ones, performed in your lifetime: how many activities, including the current one, had you performed?". The regression results for the sample of 19,024 wage earners who have responded to this question are reported in Table 4. Column 1 shows that the effect of the urban scale on raw turnover rates is quite difficult to interpret: when compared to the smallest municipalities, turnover rates are higher everywhere else; however, the effect is stronger for either Large Villages or Large MAs. Controlling for workers' observables (Column 2) makes things clearer, since the effect increases with the size of the city. Quite interesting, turnover decreases with education. Moreover, it is lower for females and southern residents while it is higher for married workers. Turning to cross-effects (Column 3), I find mixed evidence: the number of lifetime jobs held by college graduates is higher in Midsize MA but not in Large MA, while city size does not matter for those with an high school diploma (I also find that the female negative effect and the married worker positive effect on job turnover are substantially reduced in larger cities).

The evidence on turnover can hardly be deemed as decisive. Good matches are less prone to termination. Therefore, the fact that workers in urban areas can be better matched with their employers might bias downwards the effect of the urban scale on turnover. The next step is to evaluate to what extent cities enhance good matches.

I start by considering an *indirect* measure of job quality: tenure (the number of years spent with the current employer). This is the variable used by Glaeser and Maré (1994) to proxy for job quality. In the wage and salary sample the data on tenure are available for 18,693 individuals. Table 5 reports the regression results. Again, the raw effects (Column 1) are meaningless. By controlling for the workers' observables (Column 2), I find that all city size dummies display a negative sign. However, the effect is only significant for Large MAs. Turning to Column 3, I note that the interactions between urban status and educational attainments are never significant. Clearly, this is evidence against the idea that the urban scale affects positively the quality of the matches.[23]

How to evaluate the quality of a worker's match has traditionally been a mounting task. Many of the thinks that make a match a good one are generally not covered in the surveys. Besides, the indirect measures fall generally short of capturing the non-monetary aspects that might have no relationship with wages but that affect the appeal of the job especially for the more educated. In what follows, I take advantage of the detailed information on job satisfaction provided by the SHIW in 1995. In this wave, the following question was made to 2,809 employed individuals: "Apart from the economic aspects, how do you judge the overall satisfaction from your work?" Interviewed were required to provide a rating between 1 (lowest) and 5 (highest). Respondents were then asked to provide a finer judgment of their job satisfaction according to the following six criteria: environmental conditions (physical and social); dangerousness for life or health; effort required; interestingness; consideration by others; concern about losing their employment. I show in Table 6 the regression results obtained by using the overall job satisfaction index as dependent variable. Obviously, these results should be taken cautiously given their qualitative nature. However, they show quite unambiguously that the urban scale does not seem to affect job satisfaction (while, irrespective of the location, the satisfaction of the more educated is higher than those of less educated counterparts). The only statistical significant

[23] A second *indirect* measure for job quality is given by the work status. Jobs of better qualities are characterized by higher qualifications, which are recorded by the SHIW through the following categories: blue-collar worker or similar; office worker or school teacher; junior manager; manger or senior official. However, when I probit estimate the effect of city size on a dependent variable that takes on the value of one for the two categories of junior manager and manger or senior official, I still find inconclusive evidence (these results are available on request). For instance, high school diplomats are penalized by the urban residence. Moreover, while I find that college graduates are more likely to have an higher work status in Midsize MAs, I fail to find a similar effect for the Large MAs.

effect of the urban scale on job satisfaction regards a negative differentials for the urban females. I also estimate a single regression for each of the six criteria of judgement, by using the same specification as in Table 6, Column (3). The coefficients of interest (dummies for Midsize and Large MAs, dummies for High School and College achievements, and their interactions) are summarized in Table 7. The results show that college educated living in Large MAs seem to be more satisfied as regard to the environmental work conditions and the safety of their job. On the other hand, no statistical significant effect materializes for the college educated dwelling in Midsize MAs. Furthermore, the impact of the urban location for the high school educated is more puzzling. Those dwelling in a Large MA enjoy jobs that are deemed as less dangerous for life or health, but at the same time they are quite dissatisfied as regard to the considerations that they receive by others. High school educated dwelling in Midsize MAs are even less happy. They still enjoy safer jobs but complain not only for the consideration they receive but also for the environmental job conditions.

Generally speaking, these results suggest that non-wage benefits might barely be relevant to explain the skill-agglomeration connection. The idea that in urban centers workers can change jobs more readily than elsewhere does not receive empirical support. Perhaps more importantly, the analysis of both indirect proxy for job quality and direct measures of job satisfaction casts some on the assumption that workers in urban areas are better matched with their employers.[24]

6. Consumption

The empirical investigation carried out so far shows that the substantial Urban Rent Premium is not offset by gains on the productivity side. To check whether other sources of urban benefits may help to explain the skill-agglomeration connection, I turn now to amenities.

There are many reasons to expect that amenity evaluations vary across locations and skill groups. For instance, residents of large urban areas may particularly like cultural amenities while residents of non-urban areas may strongly dislike congestion. Within urban

[24] I also investigated the relevance of the idea that the dual career problem is less acute in cities (Costa and Kahn (2000)). However, the likelihood for College and High school educated partners to be both in employment is not affected by the urban size.

areas, certain amenities such as specialized schools or museums may predominantly be appreciated by the more skilled. I focus below on *direct* measures of the quality of life at the local level. In the 1993 wave, SHIW respondents were asked to provide their own evaluation about a bunch of quality of life determinants. In particular, fifteen quality of life questions were posed to the household heads, who where required to 1) base the answer on both their personal experience and the experience of their family members[25] and 2) refer to their municipality of residence. The fifteen characteristics of the local quality of life surveyed were: Public Transportation, Health Services, Universities, Local Bureaucracy, Traffic Congestion, Water Quality, Nursery, Primary and Secondary School, Street Cleaning, Green Areas, Safety and Crime Control, Shopping Possibilities, Leisure Activities, Air Pollution, Noise Pollution. Respondents chose a number from 1 (lowest satisfaction) to 10 (highest satisfaction) for each characteristic. To construct an index for the overall of quality of life, I summed (Table 10) the values over 14 out of 15 elementary indexes.[26] The index shows a mean value of 76.8, with a standard deviation of 19.4. Results are shown in Table 8. Raw differentials (Column 1) indicates a fast worsening of the quality of life with city size. The estimated negative impact for Large MAs is twice the negative impact estimated for Small MAs or Midsize MAs. However, controlling for individual observables (Column 2) decreases the negative effect of the urban scale on the quality of life. Crucially, allowing for interactions changes the picture to a large extent. I find that the negative effect is limited to the less skilled. In particular, both the High School and the College educated enjoy a substantial amenity premium by dwelling in a larger urban center. Interesting, the satisfaction of married workers is also positively affected by the urban scale. On the other hand, southern workers – who are already relatively penalized by living in the less developed area of the country – experience an additional negative amenity premium.

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[25] The question was: "On the basis of your personal experience and the experience of your family member (please, refer to actual experience and not to what you might have read on newspaper) how would you rate your municipality for the following aspects of the quality of life…".

[26] Since it is constructed by summing the elementary items, the index for the overall quality of life is based on the smallest number of respondents across elementary indexes. To avoid an unduly reduction of the number of respondents, I excluded from the overall index the evaluations of the local universities, which were provided only by 1,694 individuals. The reason why many respondents did not answer to this question is that, even though in Italy university infrastructures are quite disperse over the national territory, the number of municipalities with less than 20,000 inhabitants with an university center is extremely low. Therefore, the individuals residing in a municipality with no university did not answer to the question. In any case, as I checked, results from the overall index that includes the evaluations of the local universities are quite similar to those reported in the text.

Finally, I turn to the elementary entries of the quality of life. Elementary entries enter with equal weights in the index of overall quality of life. This however could be misleading, to the extent that some amenities are more important than others in the evaluation across skill groups. To tackle this issue, I estimate a single regression for each of the 15 indexes, by using the same specification as in Table 8, Column (3). Table 9 reports a selection of the coefficients of interest (dummies for Midsize and Large MAs, dummies for High School and College achievements, and their interactions). The results suggest that the College educated living in Large MAs are particularly satisfied of the local public good services, such as transportation, health and schooling services. Moreover, they seem to enjoy to a large extent the shopping possibilities offered by a large urban center as well as the cultural consumption potentials made it possible by cinemas, theaters, and museums. Quite surprisingly, the traditional urban disamenities, such as street cleaning and crime do not seem to bother the College educated more than the less educated counterparts. The High School educated show a similar pattern. However, they seem to be less happy with the local transportation system but more satisfied with the local nurseries. Again, they do not evaluate street cleaning so much and give less importance to the leisure activities. Midsize MAs, are still appreciated by the skilled but for somewhat different motives. For instance, for the more educated living there the local conditions of the traffic and noise pollution seem to be much weighted. In addition, shopping possibilities seem also important while the cultural consumption possibilities appear to matter only for those at the upper end of the skill distribution.

By and large, the evaluations of the local quality of life of the more educated in the larger urban areas support the idea that urban amenities are an important explanation of the skill-agglomeration connection. Clearly, since the individual evaluations collected by the SHIW are only suggestive, a quantification of their role can be only tentative. In any case, to provide a back-of-the-envelop calculation I estimated for the same sample of workers the percentage share of rent costs out of the salary. I find that the rents (of the principal residence of the household) are approximately equal to 1/3 of the average individual wage. Therefore, since the extra rents for Large MAs can be calculated in 50%, and there is no Urban Productivity Premium, my guess estimate would be that the value of the consumption amenities can be as high as 50% of the rents or 16-17% of the wages.

7. Conclusion

The concentration of human capital in large cities has long been a longstanding issue in urban economics. The related theory has clarified that for the more skilled there could be two sources of urban benefits. The first source refer to production. For instance, human capital externality theories stress that more skilled workers may benefit more from urban areas because they are better able to learn from others. On related grounds, the labor market pooling theories focus on the non-monetary advantages that urban centers provide to the more educated, particularly in terms of finding a better match. The second source of urban benefits is related to consumption. The urban amenity theories emphasis that cities offer a better quality of life, which is likely to be a normal good and thus particularly appreciated by workers with more human capital.

To gauge the respective roles of these explanations, I have used a unique dataset on household– and individual–level data for the Italian cities. The dataset provides information on both production– and consumption–related urban benefits. In particular, I have exploited data on individual evaluations of the job satisfaction and the local quality of life. Moreover, to obtain an order of magnitude for the overall net effects, I have used data on dwellings to estimate city rents.

The findings show that skilled workers enjoy higher consumption amenities in larger cities. In particular, they seem to enjoy the local public goods – such as transportation, health and schooling services –, the shopping possibilities and the cultural consumption potentials made possible by the urban location of cinemas, theaters, and museums. On the other hand, the more educated do not seem to receive benefits on the production side. Their wages do not reflect a premium, and the returns to education and experience do not seem to be higher than elsewhere. Moreover, there is no evidence of non-wage benefits. Urban workers do not change jobs more readily than elsewhere. In addition, they do not appear to be more satisfied of their jobs. I also estimate that the extra rent costs for urban dwellings are substantial. The estimates imply that in the largest metropolitan areas the value of the consumption amenities for the more skilled can be as high as 50% of the rents or 16-17% of the wages.

Tables and Figures

Table 1

DESCRIPTIVE STATISTICS

	Mean	Std. Dev.	Obs.
(Log) Rents	8.712	0.709	27,931
City Size: Villages	0.101	0.302	27,931
Large Villages	0.156	0.363	27,931
Small MAs	0.298	0.457	27,931
Midsize MAs	0.297	0.458	27,931
Large MAs	0.147	0.354	27,931
Surface area	103.721	52.144	27,931
Age of the house	50.206	74.662	27,931
Bathrooms	0.350	0.484	27,931
Heating system	0.816	0.387	27,931
South	0.349	0.477	27,931
(Log) Wages	2.464	0.406	23,371
Educational Achievement: Elementary School	0.125	0.330	23,371
Junior High School	0.325	0.468	23,371
High School	0.428	0.495	23,371
College	0.122	0.328	23,371
Experience	22.219	11.720	23,371
Female	0.392	0.488	23,371
Married	0.669	0.471	23,371
Job Turnover	2.030	1.473	19.024
Tenure	14.058	10.552	18,693
Overall Job Satisfaction	3.564	1.078	2,809
Overall Quality of Life	78.826	19.389	3,636

Notes.- Source SHIW 1993-2000. The description of the variables is in the Appendix. To save space, the table does not report summary statistics for the following variables: House location, Subjective house ratings, Job satisfaction Single Item Evaluations, and Elementary Indexes of Quality of Life.

Table 2

EFFECT OF CITY SIZE ON RENTS

	(1)	(2)	(3)
City Size			
Large Villages	0.203***	0.136***	0.135***
	(0.069)	(0.042)	(0.039)
Small MAs	0.242***	0.240***	0.232***
	(0.054)	(0.034)	(0.031)
Midsize MAs	0.261***	0.294***	0.293***
	(0.053)	(0.033)	(0.030)
Large MAs	0.446***	0.500***	0.494***
	(0.074)	(0.054)	(0.049)
House Characteristics			
Surface Area in m2 (X100)	-	0.417***	0.315***
		(0.020)	(0.016)
Age of the House (X100)	-	-0.064***	-0.039***
		(0.008)	(0.007)
Dummy for two Bathrooms	-	0.219***	0.159***
		(0.013)	(0.011)
Dummy for Heating System	-	0.349***	0.199***
		(0.018)	(0.015)
P-value for House's Location	-	[0.0000]	[0.0000]
Dummy for South	-	-0.305***	-0.282***
		(0.023)	(0.021)
Subjective ratings			
P-value for House Rating	-	-	[0.0000]
P-value for Location Rating	-	-	[0.0000]
Intercept	8.213***	7.462***	7.869***
	(0.049)	(0.048)	(0.061)
Time dummies	YES	YES	YES
R2	0.083	0.391	0.489
N. Obs.	27,931	27,931	27,904

Notes.- Source SHIW 1993-2000. The White robust standard errors reported in parentheses are corrected for the potential clustering of the residuals at the city level. Regressions are weighted to population proportions. *** (**) [*] denotes significance at the 1% (5%) [10%] level.

Table 3

EFFECT OF CITY SIZE ON WAGES

	(1)	(2)	(3)		
			No Interaction	Interaction with Midsize MA	Interaction with Large MA
City Size					
Large Villages	0.028	0.012	-	-	-
	(0.024)	(0.019)			
Small MAs	0.055**	0.005	-	-	-
	(0.022)	(0.017)			
Midsize MAs	0.092***	0.015	-0.061	-	-
	(0.021)	(0.017)	(0.042)		
Large MAs	0.147***	0.026	-0.008	-	-
	(0.026)	(0.019)	(0.071)		
Worker Characteristics					
Dummy for Junior High School	-	0.175***	0.162***	0.037	0.036
		(0.012)	(0.016)	(0.025)	(0.041)
Dummy for High School	-	0.457***	0.450***	0.025	0.011
		(0.017)	(0.023)	(0.031)	(0.054)
Dummy for College	-	0.814***	0.826***	-0.004	-0.021
		(0.021)	(0.030)	(0.041)	(0.065)
Experience	-	0.032***	0.031***	0.001	0.001
		(0.001)	(0.002)	(0.002)	(0.004)
Experience Squared (X100)	-	-0.040***	-0.040***	-0.002	-0.000
		(0.003)	(0.003)	(0.005)	(0.007)
Dummy if Female	-	-0.087***	-0.086***	0.014	-0.013
		(0.008)	0.009	(0.014)	(0.023)
Dummy if Married	-	0.081***	0.079***	0.015	0.000
		(0.008)	0.011	(0.016)	(0.023)
Dummy for South	-	-0.088***	-0.100***	0.029	0.034
		(0.013)	0.017	(0.025)	(0.036)
Intercept	2.334***	1.619***	1.644***	-	-
	(0.021)	(0.025)	(0.030)	-	-
Time dummies	YES	YES	YES	-	-
R2	0.04	0.40		0.40	
N. Obs.	23,371	23,371		23,371	

Notes.- Source SHIW 1993-2000. The White robust standard errors reported in parentheses are corrected for the potential clustering of the residuals at the city level. Regressions are weighted to population proportions. *** (**) [*] denotes significance at the 1% (5%) [10%] level.

Table 4

EFFECT OF CITY SIZE ON JOB TURNOVER

	(1)	(2)	(3)		
			No Interaction	Interaction with Midsize MA	Interaction with Large MA
City Size					
Large Villages	0.201***	0.161*	-	-	-
	(0.057)	(0.087)			
Small MAs	0.131**	0.155*	-	-	-
	(0.052)	(0.085)			
Midsize MAs	0.145***	0.207**	0.036	-	-
	(0.050)	(0.083)	(0.151)		
Large MAs	0.255***	0.287***	0.165	-	-
	(0.060)	(0.098)	(0.178)		
Worker Characteristics					
Dummy for Junior High School	-	-0.186***	-0.263***	0.104	0.303**
		(0.061)	(0.084)	(0.128)	(0.123)
Dummy for High School	-	-0.437***	-0.452***	0.102	-0.013
		(0.068)	(0.092)	(0.133)	(0.168)
Dummy for College	-	-0.604***	-0.720***	0.291*	0.220
		(0.076)	(0.112)	(0.169)	(0.168)
Experience	-	0.041***	0.044***	0.000	-0.013
		(0.004)	(0.006)	(0.011)	(0.011)
Experience Squared (X100)	-	-0.001***	-0.076***	-0.000	0.037***
		(0.000)	(0.013)	(0.022)	(0.022)
Dummy if Female	-	-0.366***	-0.425***	0.081	0.220***
		(0.030)	(0.040)	(0.065)	(0.077)
Dummy if Married	-	0.168***	0.247***	-0.208**	-0.178*
		(0.039)	(0.048)	(0.102)	(0.101)
Dummy for South	-	-0.597***	-0.620***	0.146	-0.075
		(0.047)	(0.062)	(0.101)	(0.132)
Intercept	1.949***	1.925***	2.056***	-	-
	(0.049)	(0.104)	(0.103)		
Time dummies	YES	YES	YES	-	-
R2	0.01	0.10		0.10	
N. Obs.	19,024	19,024		19,024	

Notes.- Source: SHIW 1993-2000. The White robust standard errors reported in parentheses are corrected for the potential clustering of the residuals at the city level. Regressions are weighted to population proportions. *** (**) [*] denotes significance at the 1% (5%) [10%] level.

Table 5

EFFECT OF CITY SIZE ON TENURE

	(1)	(2)	(3)		
			No Interaction	Interaction with Midsize MA	Interaction with Large MA
City Size					
Large Villages	-0.724	-0.423	-	-	-
	(0.660)	(0.445)			
Small MAs	0.400	-0.370	-	-	-
	(0.643)	(0.430)			
Midsize MAs	0.272	-0.495	0.008	-	-
	(0.694)	(0.405)	(2.209)		
Large MAs	0.589	-0.765*	-2.368	-	-
	(0.694)	(0.398)	(2.900)		
Worker Characteristics					
Dummy for Junior High School	-	1.385***	1.521***	-0.127	-0.914
		(0.379)	(0.488)	(0.784)	(1.046)
Dummy for High School	-	1.038***	0.867*	0.164	0.485
		(0.362)	(0.475)	(0.759)	(0.903)
Dummy for College	-	-1.032***	-0.869	-0.937	0.196
		(0.399)	(0.626)	(0.896)	(0.980)
Age	-	0.435***	0.448***	-0.042	0.091
		(0.065)	(0.092)	(0.119)	(0.163)
Age Squared (X100)	-	0.390***	0.364***	0.075	-0.083
		(0.085)	(0.119)	(0.155)	(0.227)
Dummy if Female	-	-0.159	0.189	-0.345	-1.439***
		(0.161)	(0.216)	(0.304)	(0.410)
Dummy if Married		0.687***	0.409	0.536	0.651
	-	(0.235)	(0.332)	(0.449)	(0.531)
Dummy for South		0.232	0.277	0.280	-0.450
	-	(0.257)	(0.386)	(0.519)	(0.502)
Intercept	12.631***	-10.788***	-11.162***	-	-
	(0.567)	(1.316)	(1.695)		
Time dummies	YES	YES	YES	-	-
R2	0.01	0.56		0.57	
N. Obs.	18,693	18,693		18,693	

Notes.- Source: SHIW 1993-2000. The White robust standard errors reported in parentheses are corrected for the potential clustering of the residuals at the city level. Regressions are weighted to population proportions. *** (**) [*] denotes significance at the 1% (5%) [10%] level.

Table 6

EFFECT OF CITY SIZE ON OVERALL JOB SATISFACTION

	(1)	(2)	(3)		
			No Interaction	Interaction with Midsize MA	Interaction with Large MA
City Size					
Large Villages	0.112	0.101	-	-	-
	(0.140)	(0.147)			
Small MAs	0.087	0.069	-	-	-
	(0.122)	(0.123)			
Midsize MAs	0.041	0.022	0.174	-	-
	(0.119)	(0.123)	(0.295)		
Large MAs	0.029	-0.014	0.160	-	-
	(0.108)	(0.114)	(0.303)		
Worker Characteristics					
Dummy for Junior High School	-	0.116	0.157	0.025	-0.087
		(0.103)	(0.150)	(0.190)	(0.245)
Dummy for High School	-	0.284***	0.365**	-0.241	0.016
		(0.108)	(0.157)	(0.218)	(0.256)
Dummy for College	-	0.278**	0.144	0.221	0.349
		(0.139)	(0.181)	(0.262)	(0.322)
Experience	-	-0.012	-0.003	-0.022	-0.015
		(0.010)	(0.014)	(0.022)	(0.018)
Experience Squared (X100)	-	0.034	0.026	0.023	0.009
		(0.021)	(0.032)	(0.047)	(0.040)
Dummy if Female	-	-0.018	0.051	-0.042	-0.250**
		(0.055)	(0.069)	(0.119)	(0.122)
Dummy if Married	-	-0.038	-0.097	0.184	0.094
		(0.081)	(0.087)	(0.153)	(0.245)
Dummy for South	-	-0.016	-0.101	0.233	0.197
		(0.097)	(0.131)	(0.173)	(0.167)
Intercept	3.508***	3.422***	3.339***	-	-
	(0.104)	(0.174)	(0.196)		
R2	0.01	0.20		0.22	
N. Obs.	2,809	2,809		2,809	

Notes.- Source: SHIW 1995. The dependent variables is the respondent's subjective evaluations (1=lowest satisfaction, 5=highest satisfaction) for Overall Job Satisfaction The White robust standard errors reported in parentheses are corrected for the potential clustering of the residuals at the city level. Regressions are weighted to population proportions. *** (**) [*] denotes significance at the 1% (5%) [10%] level.

Table 7

EFFECT OF CITY SIZE ON JOB SATISFACTION: SINGLE ITEM EVALUATIONS

	Dummy for Midsize MA	Dummy for Large MA	Dummy for High School	Dummy for College	Interactions:				N. Obs
					Midsize MA and High School	Large MA and High School	Midsize MA and College	Large MA and College	
~~Dependent Variables~~									
Environmental Conditions (Physical and Social)	0.115	-0.109	0.352***	0.360***	-0.414**	0.114	0.060	0.424*	2,806
	(0.252)	(0.270)	(0.108)	(0.146)	(0.184)	(0.163)	(0.231)	(0.221)	
Dangerousness for Life or Health	0.110	-1.567***	-0.807***	-1.062***	0.455*	0.908***	0.229	1.016***	2,808
	(0.327)	(0.369)	(0.173)	(0.202)	(0.239)	(0.293)	(0.273)	(0.338)	
Effort Required	0.258	-0.088	0.212*	0.141	-0.208	-0.019	0.058	0.130	2,811
	(0.246)	(0.317)	(0.113)	(0.143)	(0.156)	(0.284)	(0.198)	(0.296)	
Interestingness	-0.106	-0.084	0.392***	0.354**	-0.199	-0.080	0.252	0.110	2,810
	(0.248)	(0.230)	(0.104)	(0.161)	(0.167)	(0.173)	(0.228)	(0.188)	
Consideration by Others	0.364	0.842**	0.699***	0.237	-0.555**	-0.803**	0.091	-0.143	2,804
	(0.313)	(0.378)	(0.152)	(0.204)	(0.222)	(0.358)	(0.325)	(0.451)	
Concern about Losing Your Employment	0.306	0.057	-0.762***	-0.722***	0.095	0.022	-0.241	-0.259	2,808
	(0.379)	(0.316)	(0.154)	(0.195)	(0.249)	(0.292)	(0.322)	(0.358)	

Notes.- Source: SHIW 1995. The dependent variables are the respondent's subjective evaluations (1=lowest satisfaction, 5=highest satisfaction) for the above single item evaluations of Job Satisfaction. The table reports regression results from the same specification as Table 6, Column (3). Regressions include also the following (not reported) variables: Dummy for Junior High School; Experience; Experience Squared; Dummy if Female; Dummy if Married; Dummy for South; as well as their interactions with Dummy for Midsize MA and Dummy for Large MA. The White robust standard errors reported in parentheses are corrected for the potential clustering of the residuals at the city level. Regressions are weighted to population proportions. *** (**) [*] denotes significance at the 1% (5%) [10%] level.

Table 8

EFFECT OF CITY SIZE ON OVERALL QUALITY OF LIFE

	(1)	(2)	(3)		
			No Interaction	Interaction with Midsize MA	Interaction with Large MA
City Size					
Large Villages	-1.203	-2.047	-	-	-
	(2.943)	(2.025)			
Small MAs	-8.392***	-4.656***	-	-	-
	(2.723)	(1.836)			
Midsize MAs	-8.391***	-5.865***	1.486	-	-
	(2.804)	(1.854)	(9.930)		
Large MAs	-16.879***	-9.064***	-4.298**	-	-
	(3.752)	(2.217)	(2.050)		
Worker Characteristics					
Dummy for Junior High School	-	-0.898	-2.323	2.687	2.932
		(1.230)	(1.520)	(2.690)	(3.186)
Dummy for High School	-	-2.585*	-4.274**	6.068**	6.191*
		(1.350)	(1.747)	(2.964)	(3.275)
Dummy for College	-	-0.224	-2.907	6.064**	7.447**
		(1.489)	(2.100)	(3.403)	(3.438)
Age	-	-0.339	-0.218	-0.523	-0.182
		(0.230)	(0.333)	(0.481)	(0.519)
Age Squared (X100)	-	0.447	0.378	0.413	0.041
		(0.283)	(0.411)	(0.590)	(0.655)
Dummy if Female	-	0.242	0.435	-0.840	-0.843
		(0.627)	(0.922)	(1.233)	(1.288)
Dummy if Married	-	-1.684*	-4.329***	7.007***	6.378***
		(1.019)	(1.509)	(2.042)	(2.354)
Dummy for South	-	-18.376***	-16.303***	-6.872**	-4.069
		(1.485)	(2.029)	(3.244)	(3.694)
Intercept	84.164	99.078***	94.136***	-	-
	(2.159)	(5.072)	(6.636)		
R2	0.10	0.30		0.29	
N. Obs.	3,636	3,636		3,636	

Notes.- Source: SHIW 1993. The dependent variables is the index of Overall Quality of Life, which is constructed by summing up the respondent's subjective evaluations (1=lowest satisfaction, 10=highest satisfaction) for the Elementary Indexes of Table 9 (with the exclusion of the University Index). The White robust standard errors reported in parentheses are corrected for the potential clustering of the residuals at the city level. Regressions are weighted to population proportions. *** (**) [*] denotes significance at the 1% (5%) [10%] level.

Table 9

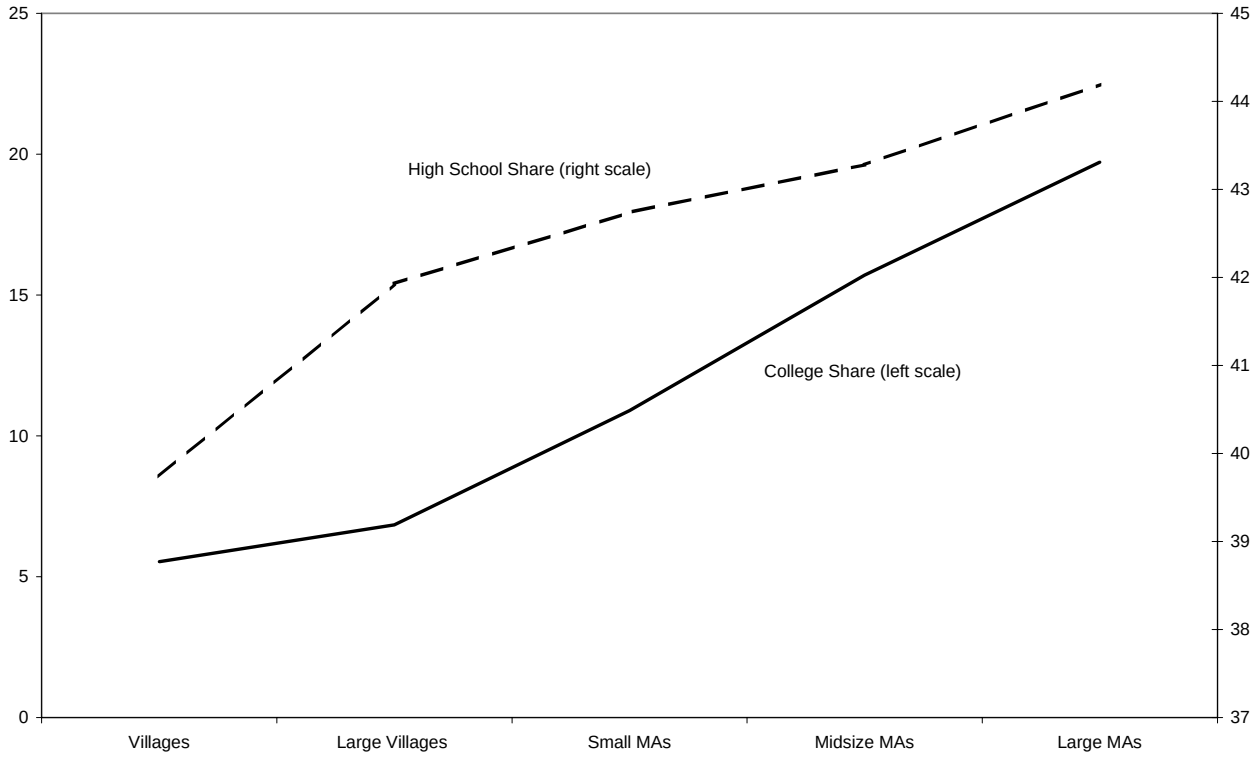
EFFECT OF CITY SIZE ON QUALITY OF LIFE: ELEMENTARY INDEXES

	Dummy for Midsize MA	Dummy for Large MA	Dummy for High School	Dummy for College	Interactions				N. Obs
					Midsize MA and High School	Large MA and High School	Midsize MA and College	Large MA and College	
Dependent Variables									
Public Transportation	0.844	-0.113	-0.103	-0.710*	-0.420	0.330	0.248	1.004**	5,417
	(1.290)	(1.570)	(0.230)	(0.369)	(0.335)	(0.329)	(0.454)	(0.457)	
Health Services	0.623	-0.099	0.049	-0.190	-0.036	0.210	0.727*	0.877**	5,806
	(1.101)	(1.633)	(0.222)	(0.300)	(0.311)	(0.303)	(0.385)	(0.344)	
Local Bureaucracy	0.852	-0.813	0.183	0.452*	0.156	0.442	0.170	0.383	5,838
	(0.982)	(1.060)	(0.191)	(0.262)	(0.278)	(0.334)	(0.354)	(0.401)	
Traffic Congestion	-0.473	-3.706***	-0.621*	-0.288	0.524*	0.807***	0.443	0.386	5,896
	(1.281)	(1.263)	(0.246)	(0.371)	(0.313)	(0.289)	(0.438)	(0.474)	
Water Quality	0.959	0.885	-0.157	0.491	0.253	-0.140	-0.246	-0.437	5,897
	(1.284)	(1.443)	(0.277)	(0.381)	(0.355)	(0.367)	(0.492)	(0.495)	
Nursery	-0.968	0.555	0.005	-0.447*	0.086	-0.158	0.746**	0.013	4,203
	(1.020)	(1.770)	(0.213)	(0.274)	(0.292)	(0.443)	(0.360)	(0.513)	
Primary and Secondary School	0.007	-0.838	0.058	-0.336	0.066	-0.009	0.475**	0.554**	4,746
	(0.881)	(1.205)	(0.177)	(0.235)	(0.255)	(0.354)	(0.218)	(0.252)	
Street Cleaning	0.345	-1.259	0.209	-0.294	-0.038	0.569	0.150	0.744*	5,906
	(0.920)	(0.946)	(0.173)	(0.231)	(0.262)	(0.352)	(0.334)	(0.428)	
Green Areas	1.884*	-1.710	-0.136	-0.277	0.051	0.815	0.521	0.833	5,904
	(1.135)	(2.091)	((0.236)	(0.355)	(0.327)	(0.548)	(0.454)	(0.721)	
Safety and Crime Control	-0.793	-2.263**	-0.081	-0.042	0.365	0.567*	0.625*	0.570*	5,856
	(1.022)	(1.094)	(0.216)	(0.245)	(0.300)	(0.321)	(0.340)	(0.342)	
Shopping Possibilities	2.273**	-1.425	-0.368*	-0.363	0.739**	0.986*	0.940***	1.180**	5,916
	(1.045)	(1.332)	(0.215)	(0.251)	(0.300)	(0.578)	(0.342)	(0.596)	
Leisure Activities (Cinemas, Theaters, etc.)	2.860**	0.255	0.018	0.575**	0.159	0.979***	-0.051	1.132**	5,808
	(1.260)	(1.558)	(0.192)	(0.293)	(0.305)	(0.337)	(0.425)	(0.502)	
Air Pollution	-2.268**	-3.990**	-0.085	-0.016	0.207	0.497	0.031	-0.034	5,914
	(1.038)	(1.822)	(0.307)	(0.400)	(0.381)	(0.397)	(0.480)	(0.519)	
Noise Pollution	-1.597	-0.847	-0.820***	-0.487	1.038***	1.080**	0.693*	0.643	5,908
	(1.138)	(2.190)	(0.260)	(0.359)	(0.337)	(0.420)	(0.431)	(0.428)	
Universities	*0.952*	*1.713*	*-0.582*	*0.013*	*0.640*	*0.978**	*0.014*	*0.702*	*1,694*
	(2.760)	*(3.094)*	*(0.395)*	*(0.458)*	*(0.481)*	*(0.509)*	*(0.583)*	*(0.622)*	

Notes.- Source: SHIW 1995. The dependent variables are the respondent's subjective evaluations (1=lowest satisfaction, 10=highest satisfaction) for the above components of Overall Quality of Life. The table reports regression results from the same specification as Table 8, Column (3). Regressions include also the following (not reported) variables: Dummy for Junior High School; Experience; Experience Squared; Dummy if Female; Dummy if Married; Dummy for South; as well as their interactions with Dummy for Midsize MA and Dummy for Large MA. The White robust standard errors reported in parentheses are corrected for the potential clustering of the residuals at the city level. Regressions are weighted to population proportions. *** (**) [*] denotes significance at the 1% (5%) [10%] level.

Figure 1

HIGH SCHOOL SHARE AND COLLEGE SHARE BY CITY SIZE



Notes.- Source SHIW 1993-2000. The sample includes wage and salary workers of age between 15 and 65. Observations are weighted to population proportions.

Appendix 1

Description of the variables

Variable	Description
Age of the house	Calculated as the difference between the year of the survey and the year the house was constructed, which is a data available from the SHIW.
Bathrooms	Indicator variable equal to one if two or more bathrooms are available in the dwelling.
City Size	Series of dummies for the resident population of the municipality: Villages (up to 5,000 inhabitants); Large Villages (from 5,000 to 20,000 inhabitants); Small MAs (from 20,000 to 50,000 inhabitants); Midsize MAs (from 50,000 to 200,000 inhabitants); and Large MAs (more than 200,000 inhabitants).
Educational achievement	Series of dummies for the worker's educational qualification: elementary school (5 years of schooling) ; junior high school (8 years of schooling); high school (13 years of schooling); college (18 years or more of schooling).
Experience	Calculated as the difference between worker's age at the survey date and the age at first job held, which is a data available from the SHIW.
Heating system	Indicator variable equal to one if an heating system is available in the dwelling.
House's location	Series of dummies for the location of the dwelling (isolated area, countryside; town outskirts; between outskirts and town center; town center; other; hamlet).
Job Satisfaction	Respondent's subjective evaluation (1=lowest satisfaction, 5=highest satisfaction). The question (posed only in the 1995 SHIW) was the following: "Apart from the economic aspects, how do you judge the overall satisfaction from your work?". Respondents were then asked to provide a finer judgement of their satisfaction according to the following six criteria: environmental conditions (physical and social); dangerousness for life or health; effort required; interestingness; consideration by others; concern about losing your employment.
Job Turnover	Number of work activities, including the temporary ones, performed in the worker's lifetime.
Quality of life	Respondent's subjective evaluation (1=lowest satisfaction, 10=highest satisfaction. The question (posed only in the 1993 SHIW) was the following: "On the basis of your personal experience and the experience of your family member (please, refer to actual experience and not to what you might have read on newspaper) how would you rate your municipality for the following aspects of the quality of life: Public Transportation, Health Services, Universities, Local Bureaucracy, Traffic Congestion, Water Quality, Nursery, Primary and Secondary School, Street Cleaning, Green Areas, Safety and Crime Control, Shopping Possibilities, Leisure Activities, Air Pollution, Noise Pollution."
Rents	Log of the annual rent. For each household, the interviewed can be either the property owner or the tenant. In the first case, the SHIW collects the rent the owner charges (or, if the dwelling is not rented or it is the family residence, her best estimate for the rent she could charge). In the second case, the tenant reports the actual rent paid.
South	Indicator variable equal to one for the following Italian regions: Abruzzi, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, and Sardegna.
Subjective house rating	Series of dummies for the subjective (the survey asks "How do you rate this dwelling'") rating of the dwelling (luxury; highly desirable; mid-range; modest; low-income; very low-income; rural; other).
Subjective location rating	Series of dummies for the subjective (the survey asks "How would you rate the location where the dwelling is located?") rating of the dwelling's location (highly desirable; run-down; neither highly desirable nor run-down).
Surface area	Area in square meters.
Tenure	Number of years spent with the current employer
Wages	Log of hourly wages. Hourly wages are calculated by dividing the annual earnings (from any activity as employee, including fringe benefits, net of taxes and social security contributions) by the total amount of hours worked in a year (Average Hours Worked per Week × Months Worked × 4.3333). The sample is trimmed at the 1st and 99th and percentile of the distribution of earnings.

Appendix 2

List of Large MAs and Midsize Mas

Large MAs

Trieste; Bologna; Bari; Catania; Firenze; Genova; Taranto; Venezia; Messina; Napoli; Palermo; Padova; Verona; Roma; Milano; Torino.

Midsize MAs

Acireale; Afragola; Agrigento; Alessandria; Altamura; Ancona; Andria; Aprilia; Arezzo; Ascoli Piceno; Asti; Avellino; Aversa; Barletta; Benevento; Bergamo; Bisceglie; Bitonto; Bolzano – Bozen; Brescia; Brindisi; Busto Arsizio; Cagliari; Caltanissetta; Campobasso; Carpi; Carrara; Caserta; Casoria; Castellammare di Stabia; Catanzaro; Cava de' Tirreni; Cerignola; Cesena; Chieti; Chioggia; Cinisello Balsamo; Civitavecchia; Cologno Monzese; Como; Cosenza; Cremona; Crotone; Cuneo; Ercolano; Faenza; Fano; Ferrara; Foggia; Foligno; Forlì; Gela; Giugliano in Campania; Grosseto; Guidonia Montecelio; Imola; La Spezia; Lamezia Terme; L'Aquila; Latina; Lecce; Legnano; Livorno; Lucca; Manfredonia; Marsala; Massa; Matera; Mazara del Vallo; Modena; Modica; Molfetta; Moncalieri; Monza; Novara; Parma; Pavia; Perugia; Pesaro; Pescara; Piacenza; Pisa; Pistoia; Pordenone; Portici; Potenza; Pozzuoli; Prato; Quartu Sant'Elena; Ragusa; Ravenna; Reggio di Calabria; Reggio nell'Emilia; Rho; Rimini; Rivoli; Rovigo; Salerno; San Giorgio a Cremano; San Remo; San Severo; Sassari; Savona; Scandicci; Sesto San Giovanni; Siena; Siracusa; Teramo; Terni; Tivoli; Torre del Greco; Trani; Trapani; Trento; Treviso; Udine; Varese; Viareggio; Vicenza; Vigevano; Viterbo; Vittoria.

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