How Expensive Is Appropriate Housing?

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A. INTRODUCTION

There is much talk about a housing crisis in Switzerland, though very few households are homeless. The crisis relates not to scarcity of the commodity but to its high price. But, can a price be called too high when households pay it? Would they not agree to pay even higher prices for a home, should it be necessary? Indeed, most households obtain a consumer surplus from their home. When asked, they express satisfaction with their housing condition. Still, they feel that rents are excessive and that the housing market is tight.

The contradiction may be explained by households comparing their rent not with the maximum they would accept to pay but with some idea of an appropriate rent. How does a household figure out the appropriate rent? It may compare the rents paid by its reference group; it may estimate what rent covers construction and maintenance costs; it may believe, also, in a right to live in a decent home without spending more than some proportion of its income.

The affordability index rests on a variant of the latter concept, namely the idea that a household is in difficulty if it must put up more than some given share of its income for the rent. Statistical offices calculate the average rent-to-income ratio or the proportion of households that must spend more than 25%, say, of their income for the rent. A high average ratio is a sign that housing is expensive.

This paper challenges that index, following LERMAN and REEDER (1987) and YEZER (1981). The conventional affordability index suffers from shortcomings that cast doubt on its significance. There are households that *choose* to spend more than 25% of their income for housing because of the importance they attach to that commodity. To count them among households facing an affordability problem is improper. On the other hand, some households live in homes of inappropriate size or quality. The rents may be relatively low compared to their income; compared to their housing conditions they pay too much and should be counted among households in difficulty. As MIRON (1989) pointed out, the average effort rate in a population may increase when housing conditions improve: as more affordable housing becomes available, fewer households need to double up, children

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can settle into their own dwelling earlier, and the size of households shrinks; apartments are less crowded, but incomes per household diminish and effort rates increase.

Not only is the conventional index an ambiguous indicator of individual housing costs, it is also difficult to interpret as an indicator of market conditions. Some households pay low rents because they were so lucky to find a good deal, often an apartment in a subsidized development belonging to a cooperative. Some have been living for so long in the same rooms that, in a regime of restricted rent adjustments, they are privileged. Calculating their effort rates tells nothing about the terms faced by a family entering the housing market.

The affordability index can be redefined to take account of those shortcomings. An other index compares each household's income with the rental cost of housing that is judged appropriate for its needs. The rental cost is not the one actually paid by the household but an average cost on the market. So, this index is less of an indicator of households' specific housing conditions. It is more of an indicator of market conditions compared to the income of each household. Instead of observing some proportion of tenant households that put up more than 25% of their income for housing, this paper will calculate the proportion of tenant households that would have to put up more than 25% of their income for appropriate housing.

Effort rates based on the average cost of appropriate housing on the market permit to identify households facing an affordability problem. Some of those households may find special deals or they may content with sub-standard comfort. Still, they are a population "at risk."

The first step involves estimating average market rents as they depend on the units' attributes.[1] Section B does that with the help of a hedonic price equation. Section C defines the attributes of appropriate housing for each household and calculates the corresponding average market rents. Section D compares the income of each household to the rent of appropriate housing. It examines the populations that face affordability problems accor- ding to the two affordability indices. Section E tests the sensitivity of results to the affordability guideline and to the description of appropriate housing. Section F contains a short conclusion.

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1. "Market rents" in this paper are the rents charged on average on the market. That is not the same as the "market rents" referred to in the debate on the liberalization of the housing market, i.e., rents that would result in the absence of regulation.

B. MARKET RENTS

To estimate the rents charged by the market for housing of selected attributes, we use the hedonic approach. That method relates observed rent differentials to the attributes of the apartments. It is well known and frequently used in studies of the housing market. Applications to local housing markets in Switzerland can be found in GEIGER (1985), ITEN and MAIBACH (1992), KIECHLE (1985), MORESI (1989a,1989b), POMMEREHNE (1987), SOGUEL (1991), and THALMANN (1987).[2]

The most recent data set containing enough detail on apartments in Switzerland is that of the "microcensus" conducted by the federal statistical office in 1986. The specific issues of that survey were housing conditions and energy consumption by households. Approximately 6,000 households were drawn at random for a written survey. The questionnaire was returned by 4,566 households. The household's income was asked over the telephone. Only 3,856 could be reached. Of them, 2,380 are tenants. Further 900 households drop out of the hedonic regression for lack of data on some explanatory variables. For the calculation of effort rates, we must exclude the households that refused to disclose their income. The final sample contains 1,353 households.[3]

The regression model has almost the same form as in THALMANN (1987). It accounts for Switzerland's regimes of rent control or rent stabilisation in place since 1917. The rents in our sample were subject to a regime that limits rent increases based on a formula including inflation and interest rate, but it frees vacant rents. So, the level of rents for similar apartments varies with the length of residence of the current occupant.[4] Another feature of the market that affects the level of rents is the presence of non-profit landlords -cooperatives and public authorities. They generally set lower rents, or they must to do so for subsidized developments.

The following hedonic price equation describes the determination of rents on the housing market:

2.   For the purpose of estimating market rents for apartments having some desired attributes (adequacy for each type of household) we could simply have computed the average rent for apartments having those attributes in the sample. However, even with few descriptors the number of apartments having specific attributes is too small to yield reliable averages. Particularly so if some descriptors are continuous variables. It is preferable to impose some structure that allows for the comparison of apartments of different types, so as to increase the size of the sample used. That is what a hedonic price equation does.

3.   Is the final sample still representative for Switzerland, assuming that the initial sample was? The authors of the 1986 survey emphasized the representativity of their sample relative to the location of households (city or countryside) and their size. Comparing the sample of 2,380 tenants with the final sample of 1,353 on those two dimensions and on other relevant descriptors confirms that frequencies and average values hardly changed.

4.   A tenure discount can also be explained by special links between landlords and current tenants. See NOLAND (1980) and GOODMAN and KAWAI (1985) for estimates of that discount, and GUASCH and MARSHALL (1987) for a contrary view. CLARK and HESKIN (1982) find that rent control and standard landlord behavior combine to grant loyal tenants very sizable discounts.

$$R_i = R_0 \, \alpha_1^{Y_i} \left(\frac{M_i + 1}{2} \right)^{\alpha_2} \alpha_3^{S_i} \, \alpha_4^{D_{1i}} \, \alpha_5^{D_{2i}} \, \alpha_6^{D_{3i}} \, \alpha_7^{D_{4i}} \, \alpha_8^{N_i} \, \alpha_9^{C_i} \tag{1}$$

where:

R is the monthly rent paid, excluding heating and hot water,
Y is the number of years of occupation,
M is the number of rooms,
S is the total surface of the apartment divided by the number of rooms,
D_1 is a dummy for buildings built before 1947,[5]
D_2 is a dummy for buildings built between 1947 and 1960,
D_3 is a dummy for buildings built between 1961 and 1970,
D_4 is a dummy for buildings built between 1971 and 1980,
N is a dummy for apartments belonging to non-profit organisations
            (a cooperative or a public authority),
C is a dummy for apartments located in major cities or in their periphery,
α are the coefficients to be estimated.

Taking logarithms transforms equation (1) into an equation that is linear in the coefficients to be estimated:

$$\ln R_i = \beta_0 + \beta_1 Y_i + \beta_2 \ln \left(\frac{M_i + 1}{2} \right) + \beta_3 S_i + \beta_4 D_{1i} + \beta_5 D_{2i} + \beta_6 D_{3i}$$

$$+ \beta_7 D_{4i} + \beta_8 N_i + \beta_9 C_i + u_i \tag{2}$$

The few attributes forbid a richer model. We assume that the left-out attributes are not correlated with those included, and that they can be collected into a well-behaved residual u. The constant (R_0) represents the value of attributes common to nearly all apartments (kitchen, bathroom). The principal attribute of apartments – the number of rooms – enters the model in a special form that approximates the curvature observed when we plot average rents against the number of rooms.

Equation (2) could be estimated by ordinary least squares. But a glance at the housing market reveals frequent rental agreements whose conditions diverge from the standards: some landlords prefer tenant satisfaction to higher rents; some let apartments to friends and relatives on favorable terms. Also, descriptors are missing from the survey that could be important in individual cases: the location variable is very crude; the construction date

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5.   Tenants, who answered the survey, did not always know the exact construction date of the buildings.

is misleading if the unit was renovated. Finally, survey errors or wrong answers cannot be ruled out. Hopefully there are not too many such cases in the sample to invalidate the approach of equation (1). We assume that most rents follow a rule that can be approximated by equation (1) and that the other ones are isolated outliers. To avoid giving those outliers excessive weight in the regression, we compute minimum absolute deviation (MAD) estimators instead of OLS, using an iterative weighted least squares algorithm.

Table 1

HEDONIC REGRESSION FOR RENTAL APARTMENTS 1986	
Variable	**Coefficient**
Constant (β_0)	6.0703 (.0519)
Rent persistence (β_1)	-.0063 (.0011)
Modified number of rooms (β_2)	.8974 (.0338)
Surface per room (β_3)	.0036 (.0010)
Built before 1947 (β_4)	-.5415 (.0300)
Built 1947-1960 (β_5)	-.5292 (.0281)
Built 1961-1970 (β_6)	-.4278 (.0194)
Built 1971-1980 (β_7)	-.2513 (.0215)
Non-profit landlord (β_8)	-.2146 (.0260)
City dwelling (β_9)	.2630 (.0137)
$\bar{R}^2$	.55
Number of observations	1480

Standard errors are included in brackets.

Table 1 gathers the estimators of equation (2). The regression explains 55% of the variance of observed rents. The residual is greater than two standard errors for 77 observations, or 5.2% of the valid sample.[6] The good quality of the fit is somewhat surprising since important attributes had to be omitted (particularly the quality of the apartment). Can we conclude that the market works well, that comparable apartments command comparable rents? In fact, the model includes two proxies for market "imperfections": tenure discounts (estimated at 0.6% per year)[7] and rebates granted by non-profit landlords (estimated at 19%). The quality of the fit can be explained by the wide-spread use of common "rules" to set rents, by which landlords refer to a handful of easy-to-identify attributes.

Table 2

RENT DECOMPOSITION 1986	
Attribute	Estimated price (Fr./month)
Basic rent	433
Discount per year of residence	- 0.63%
Number of rooms:	
for 2 rooms	+ 44%
for 3 rooms	+ 86%
for 4 rooms	+ 127%
for 5 rooms	+ 169%
for 6 rooms	+ 208%
Average surface per room: per m²	+ 0.36%
Construction date:	
before 1947	- 42%
between 1947 and 1960	- 41%
between 1961 and 1970	- 35%
between 1971 and 1980	- 22%
Non-profit landlord	- 19%
City dwelling	+ 30%

6.   Since the estimated standard error of the residuals is 0.3, a residual exceeding two standard errors implies that the reported rent is more than 180% or less than 56% of the fitted rent.

7.   In THALMANN (1987), the estimated length-of-residence discount is 0.8% for a sample of apartments in the city of Lausanne. SOGUEL's (1991) hedonic equation for a sample of apartments in the city of Neuchâtel has a different form than the present one. At the sample mean he estimates a discount rate of 0.6% per annum, equal to ours. His estimate of the "rebate" granted by non-profit landlords is 18.3%, close to our estimated rebate of 19% on the average rent.

To help interpret the coefficients, table 2 illustrates the calculation of the market rent for a particular apartment. Fr. 433/month is the rent set in a new contract by a "for-profit" landlord for a one room apartment built after 1980 in the country-side. That amount must be augmented by 0.36% (cumulatively) for every square meter of average room surface. Thus, if the unit's surface is $30m^2$, the rent is Fr. 482. Consider a three room apartment, $70m^2$, built in 1968 in a city, owned by a cooperative, and assume that the current occupant has been staying for five years. The fitted model of equation (1) yields a rent of Fr. 580: Fr. 433, plus 86% for three rooms, plus 8.7% for the size, minus 35% for the age, plus 30% for the location, minus a rebate of 19% granted by the non-profit landlord, minus 3.1% for five years of occupation.

C. APPROPRIATE HOUSING

The hedonic rule estimated in the previous section makes it possible to estimate the average rent of a dwelling that we define as appropriate for a particular household. To that end, values must be given to each parameter defining market rents. Table 3 lists the values chosen. The definition of appropriate housing is subjective, but there exist some guidelines. In Switzerland, an apartment is regarded as crowded when the density exceeds 2 persons per room. It is considered saturated when that ratio lies between 1.5 and 2. The socio-cultural norm calls it appropriate when an apartment counts as many rooms as inhabitants.[8] Our only indicator of physical quality is the surface of the apartment. The guidelines published by the Federal housing office for developers seeking subsidies contain a surface standard: if M is the number of rooms of an apartment, its total surface in m^2 should be 10M+30. That guideline is very demanding: only 22% of the apartments in our sample meet it. We call a unit appropriate for a certain household if it satisfies the surface guideline and if it counts as many rooms as there are persons in that household.

In the calculation of rents for appropriate units we ignore social housing, as the privilege to rent from non-profit landlords is reserved to few (16% in our sample). As one can hardly expect all households to leave the cities or to dwell in housing built during a particular period, the appropriate unit defined for each household has the same location and age as its current apartment. We also retain the actual length of residence.

The pattern developed in this section makes it possible to assign to each household in the sample an appropriate apartment that fits its size and place of residence. The hedonic model of equation (1) predicts the average market rent for each household's appropriate apartment. We label it the household's "predicted rent," following LERMAN and REEDER (1987). The predicted rents answer the question in this paper's title. Yet, to get a feeling for the magnitudes, the next section compares predicted rents to incomes.

8. OFFICE FEDERAL DE LA STATISTIQUE (1982, p.41-42). That study based on the 1972 census reports 81% of households living in dwellings of appropriate or greater size. In our 1986 sample, the proportion is 91%. Note that the number of rooms includes bedrooms and living rooms.

Table 3

DEFINITION OF APPROPRIATE HOUSINGS	
Attribute	**Value**
Number of rooms	Size of household
Average surface per room (m²)	10 + 30/(# of rooms)
Construction date	Current value
Landlord	"For profit"
Location	Current value
Length of residence	(a) Actual length (b) Zero (entrant)

D. EFFORT RATES

LERMAN and REEDER label the ratio of the household's current rent to its income ARATIO, and the ratio of the household's predicted rent to its income PRATIO. ARATIO is the conventional affordability index. PRATIO is the quality-based affordability index.

ARATIO measures the actual cost of actual housing for a household of given income. ARATIO may differ from PRATIO for two reasons: (1) the household enjoys inappropriate comfort, which is the factor emphasized by LERMAN and REEDER; (2) the household's rent differs from the market average for units of that quality. If there is only concern about the household's expenditures for shelter, ARATIO would be the relevant index. There is also concern about the cost of housing in general: are there households that would have a problem affording appropriate housing on the market, independently of their current situation (imagine they had to move)? The quality-based affordability index flags those households.

PRATIO measures the average cost of appropriate housing for a household of given income and needs. A high PRATIO suggests that a household's income is *potentially* insufficient, although such a conclusion should be based on the cost of the full basket of necessities. The word "potentially" is important because a household could very well satisfy its needs with low income if it managed to obtain discounts. Such discounts are sizable precisely in the housing market. The hedonic price equation captures some discounts: non-profit landlords and long-time residence lower rents. The residual collects the other discounts: landlords set below-market rents for tenant managers, relatives, or out of charity; development subsidies combine with rent control; owners of vacant units do not wait for the tenant willing to pay the highest rent. If discounts are so pervasive that households can count on them, it is inappropriate to invert PRATIO as a measure of minimum income or poverty line.

Table 4

EFFORT RATES IN SWITZERLAND		
	Mean effort rate	Households in difficulty (%)[1]
GERHEUSER, HERTIG and PELLI (1984)[2]	0.18	18
GERHEUSER and SARTORIS (1988)[3]	0.197	21
Reduced sample[4] (ARATIO)	0.190	19.5
Fitted rents	0.189	17.8
PRATIO, actual length of residence	0.160	9.7
PRATIO, new occupant	0.170	12.0

1   Effort rate exceeds 25 percent.
2   Conventional effort rate statistics, based on the 1980 census.
3   Conventional effort rate statistics, based on the 1986 micro-census.
4   This replicates the calculations of GERHEUSER and SARTORIS (1988), except that our sample was reduced from their
     2191 households to 1353 due to missing values.

Table 4 compares the average quality-based effort rates with the effort rates calculated following the conventional definition. It compares also the proportions of households facing an affordability problem under the two definitions. The generally accepted guideline for affordable housing is that rental costs should not exceed 25% of a household's income.[9]

The average effort rates are fairly similar: 19% under the conventional definition, 16% for the quality-based index. The conventional index slightly overestimates the cost of housing. The differences are larger in the second column of table 4: the conventional index identifies about 19% of households having an affordability problem, but only 10% of all households should meet difficulties affording appropriate housing at market rates.

We developed a second set of predicted rents, which acknowledges that a new lease is concluded when a household moves to an appropriate apartment. It illustrates the conditions of the market for households entering it or moving. Even if moving to appropriate housing involves giving up length-of-residence discounts, there are still fewer households facing an affordability problem (12%) than conventionally estimated.

The conventional index classifies more households in the wrong category than the average figures suggest. Table 5 counts the populations facing an affordability problem under the conventional and under the quality-based measure respectively. While 24% of

9. Some housing assistance programs, particularly public housing, use guideline effort rates that increase with a household's income. The approach of this paper could handle them. Still, we retain the uniform rate of 25% as no consensus exists on a variable guideline.

Table 5

GROUPING BY CONVENTIONAL AND BY QUALITY-BASED AFFORDABILITY INDEX[1]				
		Conventional effort rate		
		Low	High	.
Quality-based effort rate	Low	75.9	14.4	90.3
	High	4.6	5.1	9.7
		80.5	19.5	100.0

1   The numbers are percentages of the total sample. High effort rates exceed 25 percent, otherwise they are called low.

all households are flagged by either affordability index, only 5% are flagged by both. Three households among four that spend more than 25% of their income for rent could (theoretically) rent appropriate housing for less than 25% of their income. And almost one household in two that would have to spend more than 25% of its income for appropriate housing manages to keep its effort rate below that barrier.

Table 6

HOUSEHOLD CHARACTERISTICS RELATED TO HIGH CONVENTIONAL EFFORT RATES			
Characteristic	Full sample	Group in difficulty[1]	Group in difficulty but not at risk[2]
Monthly income (Sfr.)	3990	2885	3068
Family size (persons)	2.5	2.5	2.1
Proportion of foreigners (%)	14.0	15.7	11.7
City dwellings (%)	43.9	50.4	48.7
Length of residence (years)	9.6	7.8	8.8
Too few rooms (%)	8.7	6.4	2.1
Density (persons per room)	0.76	0.70	0.61
Non-profit landlord (%)	16.3	10.6	7.7
Number of households	1353	264	195

1   They spend more than 25 percent of their income for the rent.
2   They spend more than 25 percent of their income for the rent but they could (theoretically) rent appropriate housing for less than 25 percent of their income.

Table 6 compares the characteristics of the group bearing high effort rates with those of the full sample. As expected, households in difficulty earn lower incomes, they count more foreigners, and they have been residing in the same dwelling for a shorter time. Still, the differences between that group and the full sample are not great. The third column describes the sub-group of households that pay high ARATIO but earn enough income to afford appropriate housing. These are the 14.4% of households misclassified as "in difficulty" by the conventional index (table 5). The average income in that group is somewhat closer to the sample mean; families are small and live in apartments of more than appropriate size, the vast majority of which belongs to private landlords.

Table 7

HOUSEHOLD CHARACTERISTICS RELATED TO HIGH QUALITY-BASED EFFORT RATES			
Characteristic	Full sample	Group at risk[1]	Group at risk but not in difficulty[2]
Monthly income (Sfr.)	3990	2477	2598
Family size (persons)	2.5	3.6	3.7
Proportion of foreigners (%)	14.0	26.0	25.0
City dwellings (%)	43.9	56.5	58.1
Length of residence (years)	9.6	6.3	7.7
Too few rooms (%)	8.7	34.4	51.6
Density (persons per room)	0.76	1.07	1.21
Non-profit landlord (%)	16.3	26.7	35.5
Number of households	1353	131	62

1   They would have to spend more than 25 percent of their income for adequate housing.
2   They would have to spend more than 25 percent of their income for adequate housing but they are spending less than 25 percent.

The quality-based index is better at identifying the households confronting an affordability risk on the housing market than the conventional index, as table 7 shows. It tags households (in column 2) that not only earn lower incomes but also count one extra member on average. The proportion of foreigners is almost twice the number for the full sample, and there are significantly more urban dwellers with less seniority. Many more households tagged by the quality-based index live in apartments of insufficient size. Among those households, some manage to keep their effort rate below the 25% guideline (third column). These are the 4.6% of households "forgotten" by the conventional index

(table 5). Their characteristics are similar to those of the households that are at risk and do bear high effort rates, but more of them live in crowded units and in social housing.

E. SENSITIVITY ANALYSIS

The common guideline sees an affordability problem when housing costs exceed 25% of income. That limit is a subjective one. The United States raised their affordability guideline from 25% to 30% when it became evident that too many households would be classified as facing affordability problems. Table 5 showed that the conventional and the quality-based affordability indices identify quite different affordability sub-groups. How sensitive is that comparison to the affordability guideline? Table 8 compares the sub-groups obtained when the guideline is either 20% or 30%. It shows the same results as the central case: (1) more than half the group of households at risk does bear high effort rates; (2) much less than half the group paying high effort rates is compelled to put up more than the affordability guideline for appropriate housing; (3) in the total group tagged as facing problems by either index, much fewer than one household in two are tagged by both indices.

Table 8

SENSITIVITY ANALYSIS: . GROUPING BY CONVENTIONAL AND BY QUALITY-BASED AFFORDABILITY INDEX FOR DIFFERENT AFFORDABILITY LIMITS[1]				
		Conventional effort rate		
		Low	high	
Quality-based effort rate	Low	55.4/88.8	20.2/ 6.7	75.6/95.5
	High	7.6/ 1.8	16.8/ 2.7	24.4/ 4.5
		63.0/90.6	37.0/ 9.4	100.0

1   The numbers are percentages of the total sample. The first figure in each cell corresponds to effort rates below (low) or above (high) 20 percent. For the second figure the cut-off rate is 30 percent.

The definition of appropriate housing is also a subjective one. For most households, actual housing conditions differ from appropriate ones in terms of space. For instance, 62.2% of the sample apartments count more rooms than occupants. To test the sensitivity of the results to the definition of appropriate housing, we try out another definition, which comes much closer to actual housing conditions. The appropriate number of rooms for

each household is equal to the average number for households of the same size.[10] The appropriate room size is equal to the mean in the sub-sample.

Table 9

SENSITIVITY ANALYSIS: GROUPING BY CONVENTIONAL AND BY QUALITY-BASED AFFORDABILITY INDEX FOR ANOTHER DEFINITION OF APPROPRIATENESS[1]			
	Conventional effort rate		
	Low	High	
Quality-based effort rate Low	69.8	9.8	79.6
High	10.6	9.8	20.4
	80.4	19.6	100.0

1   The numbers are percentages of the total sample. High effort rates exceed 25 percent, otherwise they are called low.

With the new definition, we find that the average PRATIO is 19.4%, and that 20.5% of the sample households would have to put up more than 25% of their income for appropriate housing. Those numbers are very close to the numbers obtained with the conventional index (table 4). Table 9 compares the populations at risk under the new definition of appropriate housing, like table 5 did for the central definition. It shows that the degree of overlap with the conventional classification of households at risk is no closer. Thus, the sensitivity analysis confirms the main problem with the conventional definition of effort rates: its misidentification of households at risk.

F. CONCLUSION

Quality-based effort rates depend on the definition of appropriate housing. Appropriateness relates to comfort concessions that can be expected from households spending a high proportion of their income on housing. It relates also, at the other end of the comfort spectrum, on the additional efforts that can be expected from households spending little on uncomfortable housing. Our definition of appropriate housing differs from the actual quality enjoyed by the population only on the size of the apartment. Still, the average effort rate (16%) and the proportion of households facing an affordability problem (10%)

10. The average number of rooms for people living alone is 2 rooms. Two-person households occupy 3 rooms on average. Households of 3, 4 or 5 persons occupy 4 rooms of average. Households of 6 persons occupy 5 rooms.

are significantly lower by the quality-based measure than by the conventional measure (19% for both figures). Furthermore, the households concerned by unaffordable housing are different under the two indices. The two groups overlap by less than one half.

The quality-based index is more perceptive of households that are at risk on the housing market. Not surprisingly, households at risk have lower incomes. They also count significantly more foreigners and more families living in the cities, and·they are larger by one family member on average. Almost half the households at risk manage to keep their effort rates below 25% by living in dwellings too small or in social housing, mostly cooperative housing. On the other hand, the conventional index tags a group of households (14% of the full sample) that could afford appropriate housing. Part of the "problem" of those households comes from a taste for ample space. The average density in that group is 0.6 persons per room against 0.8 in the full sample and 1.2 in the group of households that are at risk but not tagged by the conventional index. Yet, the major cause for their high effort rates is their reliance on private housing.

We test the sensitivity of our main results to (a) the affordability guideline, and (b) the definition of appropriate housing. Our central results are preserved: (1) more than half the households that bear high housing costs (conventional effort rates) can expect to find appropriate housing for less than the affordability guideline; (2) almost half the households actually at risk go undetected because they manage to keep their effort rate low with sub-standard or social housing.

A side result of our study is that social housing does a fair job at targeting large low-income families. Non-profit landlords house 26.7% of the households that do not earn enough income to afford appropriate-size housing at market prices, against 15.6% of the other households. Social housing, next to comfort concessions, allows half those households to spend less than 25% of their income.

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ABSTRACT

The conventional housing affordability index compares rents paid to incomes. It is a noisy statistic both for the general cost of housing and for the cost of appropriate housing for individual households. Noise comes from rent differentials between comparable units that are due to rent-control and non-profit landlords. It comes also from some households' choice of non-standard housing conditions. This paper estimates the market cost of appropriate housing and compares it to incomes. It shows that the conventional index does a fair job at estimating the average cost of housing. But, it misidentifies the households at risk on the housing market.

RÉSUMÉ

L'indice traditionnel du taux d'effort compare le loyer payé au revenu. Il est problématique autant comme mesure du coût moyen du logement que comme mesure du coût pour les ménages individuels. Les problèmes proviennent des différentiels de loyers entre appartements comparables (surveillance des loyers, logement social) et des conditions de logement inadéquates de certains ménages. Cette étude estime le coût du logement adéquat pour chaque ménage et le compare à son revenu. Elle montre que l'indice traditionnel estime bien le coût moyen du logement. En revanche, il identifie mal les ménages pour lesquels le logement est une denrée coûteuse.

ZUSAMMENFASSUNG

Der übliche Index der Wohnkostenbelastung vergleicht bezahlten Mietzins und Einkommen. Er ist ungenau sowohl als Mass der durchschnittlichen Wohnkosten, wie auch als Mass des Wohnpreises für den einzelnen Haushalt. Die Ungenauigkeit wird erstens dadurch verursacht, dass verschiedene Mietbedingungen vom Marktüblichen abweichen, und zweitens dadurch, dass manche Haushalte in unüblichen Verhältnissen wohnen. Diese Arbeit schätzt den Durchschnittszins für die angemessene Wohnung für jeden Haushalt, und vergleicht ihn mit dessen Einkommen. Sie zeigt, dass der übliche Index die Durchschnittbelastung gut wiedergibt, die Haushalte, für die Wohnen grundsätzlich teuer ist, jedoch schlecht identifiziert.