The Inefficiency of Unequal Distribution: Inequality of Housing in Hong Kong

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Dissertation

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1. Introduction

The nastiest definition of an economist, according to Okun, is "the person who knows the price of everything and the value of nothing" (1975, p. 13). This paper argues that an equally unpleasant definition of a welfare economist is the person who takes the price of everything *as* its value. If price is taken as the measurement of value, then the rich will possess significant power to define what is 'valuable'. In an extremely unequal world, it would not be surprising that using 1,000,000 tons of steel and concrete to build an admirable statue, maybe portraying some rich man, would be considered more 'valuable' than to build shelters for people who could offer to pay little or nothing. In a market economy, the inequality of purchasing power translates into the inequality of power to define what is valuable to produce and what is not.

Unfortunately, this is exactly how allocation of resources is evaluated in the current framework of economic efficiency, whose foundation was laid in the 1930s in the name of New Welfare Economics (Hicks, 1939; Kaldor, 1939) and is still influential on economic thinking today. In this framework, production is considered as separate from distribution, whereby the efficiency of resources allocation can be evaluated solely in terms of production without any reference to distribution or equality. In practice, it means that efficiency is evaluated in terms of the level of aggregate output, which is usually measured by gross domestic product (GDP), regardless of the level of inequality in distributing the output. Accordingly, allocating 1,000,000 tons of steel and concrete to building a statue instead of shelters is efficient as long as it produces a higher GDP.

Despite the logical consistency of the framework, it does not prevent us from feeling something deeply wrong in saying that erecting a statue is more efficient than building shelters in terms of resources allocation. It is not simply a sense of injustice regarding the distribution, but a sense of inefficiency regarding the use of resources. The fact that a statue has a higher market price than shelters and is therefore more valuable does not seem convincing. After all, the use of market price as the measurement of value is not more objective than our personal judgment; on the contrary, it is also a result of individual preferences being aggregated through the pricing process, which is significantly influenced by the distribution of purchasing power.

The argument that will be put forward in this paper is that production and efficiency is fundamentally inseparable from distribution and equality. This paper sets out precisely to reconcile efficiency with equality by constructing two new concepts: *real value* and *real efficiency*. The core idea is simple, namely that the real value of a good to individuals should be measured by the *proportion* of wealth, not *amount* of money, they are willing to pay for it, and real efficiency is the maximization of the total real value of a given stock of resources. Equality is embodied in the hypothetical equality of 'dollar votes'—proportion of wealth rather than amount of money—by which individuals can signify their intensity of preference for the good. Someone may be willing to pay a very high price for building a statue, but the real worth of the statue to him may be very little if the price accounts for only a tiny fraction of his wealth.

To demonstrate the practical significance of real efficiency, a fascinating example is the inequality of housing in Hong Kong, my home city, which is the main reason it has been chosen

as a case study. As will be shown further on, there is a phenomenal discrepancy between the top and the bottom in terms of living environment in this global city. While the rich live in luxury houses, the poor live in actual cages or sub-divided flats. Thanks to the dominance of the current framework of efficiency, however, such a pattern of housing supply is interpreted as a flexible market adjustment to demand, and the problem is seen as a political issue about justice or fairness, but not economic efficiency. With the new framework of real efficiency proposed here, it will be argued that the inequality of housing in Hong Kong is not simply a matter of justice or fairness, but also of economic efficiency. Indeed, it is as much an economic problem as the statue-shelter case.

This paper has the dual aim to reconcile efficiency with equality and to enrich our understanding of the housing inequality in Hong Kong. To this end, the analysis is structured into two major sections—a theoretical one and an empirical one. The first section explores the theoretical relationship between efficiency and equality by discussing the existing literature on the issue and constructing a new framework of real efficiency. The second section applies the new framework to evaluate the inequality of housing in Hong Kong, shedding light on its inefficiency and relevant policy implications.

2. The Inefficiency of Unequal Distribution

The most important argument advanced in this analysis is that production is fundamentally inseparable from distribution and therefore efficiency is also inseparable from equality. In this section, the notion of efficiency and its development is first briefly reviewed. It will then be demonstrated why the separation of production from distribution and efficiency from equality is highly problematic. Then follows a theoretical attempt to reconcile efficiency with equality in a partial equilibrium model by constructing two new concepts of real value and real efficiency. The advantages and limitations of the framework are then discussed, and the last part presents some interim conclusions and implications.

2.1 The Idea of Efficiency and Its Development

In economics, the word 'efficiency' often refers to Pareto efficiency, which is a state of allocation of resources in which it is impossible to reallocate resources to make a person better off without making another person worse off. The idea, which was first developed by Vilfredo Pareto in 1906, was characterized by its unanimity, that is, a state of allocation *X* can possibly be regarded as better than another state of allocation *Y* only when no one would oppose a shift from *Y* to *X*. The major reason behind the requirement of unanimity is to avoid the problem of inter-personal incomparability of utility, which assumes the utility gain of one cannot be weighed against the utility loss of another. Pareto efficiency thus throws absolutely no light on the matter of distribution, which by definition involves benefiting someone by harming the other. As Sen puts it, an economy can be Pareto optimal "even when some people are rolling in luxury and

others are near starvation as long as the starvers cannot be made better off without cutting into the pleasures of the rich" (2017, p. 68). Efficiency and equality are thus considered as two separate issues.

In the later extension of Pareto efficiency by Kaldor (1939) and Hicks (1939), which forms a cornerstone of the New Welfare Economics, the restriction of unanimity was relaxed. In light of the fact that any change in economic policy inevitably "benefits those on one side of the market, and damages those on the other" (Hicks, 1939, p. 706), they argue that a reallocation of resources can be regarded as efficiency-improving so long as the gains of the better off are more than enough to *hypothetically* compensate the loss of the worse off, whether or not the compensation *actually* takes place. The Repeal of the Corn Laws, for instance, is seen as efficiency-improving even though it damaged the interest of the landlords without any actual compensation (Kaldor, 1939). Efficiency improvement is accordingly interpreted as "[an increase] of aggregate real income […] since in such cases it is *possible* to make everybody better off" (Kaldor, 1939, p. 550).

The relaxation of unanimity is important, as it opens up the possibility of reconciliation between efficiency and equality. Clearly, insisting on unanimity discards any redistribution but it also makes the framework practically limited, since in reality the lack of unanimity for a *change* is often the same as the lack of unanimity for sticking to the *status quo*. Pareto efficiency can offer no guidance in this common situation, and in effect, insisting on unanimity for a *change* gives rise to a 'supreme conservatism' (Sen, 2017, p. 72). Furthermore, from the perspective of appropriation, the economy is always conflictual in the sense that an appropriation by one always

implies an exclusion of others (Weber, 1992). The appropriation of an apple by the rich implies an exclusion of the poor, and Pareto efficiency says nothing about who should get the apple. Yet, relaxing unanimity condition makes it possible to discuss and compare the gain and loss in the allocation of the apple, and a transfer of the apple from the rich to the poor may be considered efficient if the gain of the poor outweighs the loss of the rich. This is not the way the framework of efficiency has developed, however.

In fact, Kaldor-Hicks efficiency further strengthens the separation between efficiency and equality. Since Robbins' (1935) attack on interpersonal comparability, interpersonal comparison was viewed to be inadmissible, whereby it is claimed to provide no scientific ground for the study of distribution. The Kaldor-Hicks framework thus compares gains and losses in purely material terms: instead of comparing the gain and loss of people, it compares only the rise and fall of output. It follows that efficiency becomes identical to the maximization of aggregate output. In light of Pigou's (1946) separation of production from distribution, Kaldor (1939) argues that economists should only be concerned with the efficiency of production, which solely involves the growth of aggregate output, whereas equality is simply not the business of economists. This idea was later developed into the analogy of 'growing the pie', which posits that economic development should focus on economic growth, that is, "making the pie bigger" (Hennessey, 2014). In a nutshell, production and efficiency on the one hand, and distribution and equality on the other are seen as two separate issues. Some economists even go further to contend that the study

of distribution is ‘poisonous’ to sound economics (Lucas, 2002) and that there is a tradeoff between equality and efficiency—a more equal distribution comes at the cost of a smaller pie (Okun, 1975).

2.2 Against the Separation between Efficiency and Equality

It will be argued here that the separation between production and distribution, and between efficiency and equality is highly problematic because of (1) the very same problem of incomparability which equally applies to material outputs, (2) the inevitable involvement of distributional concerns in the use of market prices as measurement of value, and (3) the real waste of resources incurred by unequal distribution.

First of all, aggregate output is not a homogeneous entity; on the contrary, it is often heterogeneous in composition, so one output is intrinsically incomparable to another. It is important to remember that the ‘pie’ is a mere analogy. In reality, the total output of economic production is always made up of various products. Consider an economy which produced 3 bananas and 2 apples last year, and with a reallocation of resources, produces 2 bananas and 4 oranges this year. Has the ‘pie’ grown larger in this case? There is clearly no answer to this, as one cannot compare apples to oranges. If the impossibility of interpersonal comparison of utility prevents economists from drawing welfare conclusions from distribution, the impossibility of comparing apples to oranges should equally prevent them, in most cases, from drawing welfare conclusions from production alone.

It is true that in some cases, a reallocation of resources may lead to an expansion of output

of all sorts (e.g. from 3 bananas and 2 apples to 4 bananas and 3 apples). But efficiency improvement in this sense would be too restrictive in practice[1], since in reality a significant reallocation almost inevitably favors some production against the other (as in the Repeal of the Corn Laws). Once a trade-off between productions takes place, the problem of incomparability sets in and the alleged efficiency improvement becomes dubious.

Second, the use of market price to solve the problem of incomparability implicitly incorporates a distributional factor into the framework. The standard way to compare the values of different products is to refer to their market prices. The market values of products are then aggregated to measure the level of aggregate output, as in the calculation of GDP. This assigns to the market price the role of the measurement of value (Kahn, 1935), with which the relative worth of apple and orange can be compared. However, as discussed in the introduction, the market prices of goods and services are influenced by the distribution of purchasing power. In market, the "dollar 'votes' signal the provision and allocation of goods" via the pricing mechanism (Johnson, 1991, p. 12), but since dollar 'votes' are very often unequally distributed, the decision of what to produce is usually biased to the preferences of the rich. Consider a simple example with three types of houses: small, medium, and large; and simply assume that with an equal distribution of purchasing power, an efficient pattern of production is a full allocation of resources to the

[1] In fact, that would be the original Pareto efficiency in a version of goods and services: efficiency improvement strictly means expanding the output of one good or service without reducing that of another.

production of medium houses. The question is: what if purchasing power is not equally distributed? A probable result is that, comparing to the case of equal distribution, the rich would demand more space and the poor could not afford to compete, so market prices would differ to reflect a different pattern of demand—a smaller demand for medium and a higher demand for small and large houses. If market prices are taken as the measurement of value, a Kaldor-Hicks efficient pattern of production would be a combination of small and large dwellings instead. Obviously, the distribution of purchasing power affects the evaluation of production efficiency.

It is doubtful that there is any purely scientific ground (Kaldor, 1939) for claiming that the production of small and large dwellings means a higher level of aggregate output and thus is more efficient than that of medium ones. In fact, such a claim can only be made with some sort of interpersonal comparison. Consider another situation where a stock of resources can be used to produce either one unit of *x* or one unit of *y,* and consumer *A* prefers *x* over *y* and *B* prefers *y* over *x*. If interpersonal comparison is strictly taken as inadmissible, the Kaldor-Hicks framework cannot really determine the efficient allocation of resources and production in this case, since the preferences of *A* and *B* cannot be compared. In practice, it takes the market price as the measurement of value and in effect lets the dollar votes decide—whoever is paying more decides which of *x* and *y* is more valuable to produce. The objectivity of market price is an illusion, however. Interpersonal comparison is actually made in the sense that the intensity of preferences of *A* and *B* are compared by the number of dollar votes they cast. The distribution of votes, of course, affects the outcome. Therefore, the claim of Kaldor-Hicks efficiency to be free of interpersonal

comparison does not stand up to scrutiny, and the distributional factor is substantial in affecting the evaluation of production efficiency.

An important point here is that the separation between production and distribution cannot be made on the assumption of equal distribution. Kahn (1935) admits that prices can only be a legitimate measurement of value under the assumption of income equality, so production is separated from distribution by considering production "as though income were equally distributed" (1935, p. 2). The meaning of 'maximization of aggregate output without reference to distribution' is accordingly the maximization of aggregate output which *would be* obtained *if* income was equally distributed. This methodological stance is problematic, however. First, in a similar fashion to the theory of second best (Lipsey & Lancaster, 1956), the desirable conditions in terms of efficiency (e.g. unregulated market) derived by assuming equally distributed income may not hold if income is in fact not equally distributed. Then the implications of the analysis may be of little relevance to reality. Second, if it is recognized that income inequality can influence the evaluation of efficiency, an appropriate scientific response is to figure out the relevant logic and mechanism, rather than studying efficiency *as if* there were no inequality.

Finally, the real waste of resources incurred by unequal distribution offends the spirit of efficiency. The fundamental idea behind the concept of efficiency can be reasonably interpreted as the maximization of total value of a given stock of resources. In the Pareto case, it is to maximize the total *utility* that people derive from a stock of resource under the condition of unanimity.

In the Kaldor-Hicks extension, it is about the maximization of total *output* that a stock of resources can produce. While the conception of 'value' differs in different approaches, the logic of value maximization is consistent, and in both approaches, economic 'waste' is identified when the total value falls below the maximum possible level. With this idea in mind, the separation between efficiency and equality is challenged in light of the colossal real waste of resources around the world, which the current framework of efficiency simply cannot account for.

Food is a striking example of inefficient use of resource, but neither the Pareto nor Kaldor-Hick framework of efficiency can properly account for the gigantic scale of global food waste. Stuart's (2009) report of the 'global food waste scandal' shows that a tremendous amount of food is wasted every single day around the world. In the United States, for instance, 4,179 kilocalories are wasted per person per day as a result of surplus food wasted in the home or the supply chain or eaten in excess of dietary requirements[2], as well as inefficiently feeding surplus crops to livestock. Rich countries use up to four times more food than the minimum requirements of their population, whereas poor countries have much smaller food supplies and less wastage (Stuart, 2009, p. 302-3). To put it into perspective, almost 800 million people are still living in hunger today[3], who would be unlikely to waste the food if they had it. The stark contrast between the level of food waste and the level of hunger suggests the presence of a massive misallocation of

[2] According to National Health Service of the United Kingdom, a man and a woman only needs around 2,500 and 2,000 kilocalories per day respectively (see: http://www.nhs.uk/chq/pages/1126.aspx?categoryid=51). The level of food waste is more than 1.5 times of the daily dietary requirement.

[3] See United Nations Sustainable Development Goal 2: End Hunger, Achieve Food Security and Improved Nutrition and Promote Sustainable Agriculture. United Nations Sustainable Development. Retrieved April 14, 2017, from http://www.un.org/sustainabledevelopment/hunger/

resources. Particularly, food surplus at home and excess consumption suggests that the misallocation is related to distributional issues. Yet, neither the Pareto nor Kaldor-Hicks framework of efficiency can give due consideration to an inequality-related misallocation of resources. This failure of current approaches to account for such glaring inefficiency should not be taken as an absence of the problem; on the contrary, it calls for a remedy that can properly incorporate the distributional factor into the evaluation of efficiency.

As an additional remark, food waste associated with livestock feeding is a particularly good illustration of the role of distribution in the Kaldor-Hicks framework of efficiency. To begin with, livestock are not very efficient animals in the sense that they lose more than 70 per cent of the calories in the crops fed to them. From the perspective of Kaldor-Hicks efficiency, however, the production is efficient as long as the market price of the products (eggs, milk, meat, etc.) are higher than the cost of the inputs, meaning that there is a net value-added. But as said, the pricing process and thus the Kaldor-Hicks efficient level of production of livestock-related products are shaped by the distribution of purchasing power. Then it is not surprising that food waste related to livestock feeding is highly concentrated in rich countries—it shares roughly half of the food waste in United States and European Union, while making a negligible part in Ecuador and India, and even a negative one in Kenya, where livestock are net contributors to food supply, fed on residue and grass rather than crops (Stuart, 2009, p. 302-3). As Stuart puts it, the waste of livestock fodder "is not 'waste' in the same sense as throwing food into bins; but in that those cereals could be used to feed far more people directly than can the meat produced" (2009, p. 139). In

other words, it is fundamentally a distributional problem—the strong demand for meat backed by purchasing power in the rich countries encourages pouring million tons of cereals into cattle's stomachs rather than the ones of starving men and women. The distributional discomfort caused by livestock feeding is best expressed by Stiglitz: "[i]t appears that it is better to be a cow in Europe than to be a poor person in a developing country" (2006, p. 85). Apparently, the production of meat cannot be free of distributional implications in light of the resources it takes and the number of people it can serve. The same logic applies to many other luxury goods and services—for instance, the production of luxury houses definitely has distributional implications given the amount of land it takes and the number of people they can accommodate. As we will see in the third section, the Kaldor-Hicks efficient allocation of land to the production of different housing is similarly shaped by the distribution of purchasing power, as in the crop-livestock case.

To summarize, the Kaldor-Hicks notion of efficiency justifies the separation of production from distribution on the ground of interpersonal incomparability, but the problem of incomparability equally applies to the products that make up the aggregate output. In using market prices to solve the problem, the framework of Kaldor-Hicks efficiency has implicitly incorporated a distributional factor and in effect made interpersonal comparison on an unequal ground, since people have different amount of 'dollar votes'. The alleged separation between production and distribution and between efficiency and equality is therefore sophistry. Furthermore, the failure of the current frameworks in accounting for inequality-related real waste of resources suggests the need to properly incorporate the distributional factor into the framework of efficiency. As we

are living in a world with limited resources, which most economists would agree, pouring million tons of crops into the stomach of livestock cannot be purely a matter of production. To borrow words from Okun: "[t]he production and distribution aspects are separated in economic analysis, but not in economic life" (1975, p. 34).

2.3 Real Value and Real Efficiency

As production and efficiency cannot be separated from distribution and equality, then, the right question is how the latter should be incorporated into the former, which inevitably involves also the question of how to make interpersonal comparison in a proper manner. So, we now turn to the major purpose of this study to explore the theoretical possibility of incorporating distribution into the framework of efficiency, that is, the maximization of the total value of a given stock of resources.

As already been shown, the framework of Kaldor-Hicks efficiency does not incorporate the distributional factor and cannot account for the inequality-related real waste around the world, which may be attributed to its explicit reluctance about interpersonal comparison. It may be true that the individual utility or intensity of preference for goods or services can never be accurately compared between individuals, but this does not eliminate the possibility of a loose comparison. As Sen (1970) argues, the attack on interpersonal comparability "has not distinguished between *some* comparability and *total* comparability" (p. 395), and by introducing some limited variability in the welfare units of different individuals, a partial comparison is possible. The analysis here follows the idea of partial comparability in the sense that it does not claim the interpersonal

comparison of value to be an accurate measurement, but instead a very loose one, and its purpose is *not* to compare levels of efficiency at small margins, but to identify severe inefficiencies that demand immediate action.

The cornerstone of this framework is the concept of real value, which is defined as the maximum *proportion* of wealth an individual is willing to pay for a good or a service. 'Wealth' here refers to the present value of the totality of purchasing power which a person has access to in his or her lifetime without suffering insolvency. The concept of real value is defined as opposed to the concept of effective value, which is economic value defined in the ordinary sense as the maximum *amount* of money an individual is willing and *able* to pay for a good or service. The relationship between real value and effective value is as follows: $\mathrm{W} \times \mathrm{RV} = \mathrm{EV}$, where W is wealth, RV is real value, and EV is effective value.

The argument for real value is based on the following premises: the benefit that an individual can derive from a good or service is reflected in his intensity of preference for it; the intensity of preference is in turn signified by his willingness to pay: the more important a good is to a person, the more willing he is to pay for it. Then the question is how to compare willingness to pay between individuals. The commonly used effective value (i.e. economic value) is unsatisfactory, as it measures not only willingness but also ability to pay. As the saying goes, "the real worth of things to a man is not gauged by the price he pays for them" (Marshall, 1920, p. 107). On the one hand, an individual may pay very little but gain much benefit (e.g. buying water); on

the other hand, and more importantly, he may pay a large sum of money for something that benefits him very little as he is simply rich enough to do so (e.g. buying a second home in another country). The concept of real value is meant to level the playing field: it hypothetically equalizes the 'dollar votes' of everyone. By taking proportion of wealth instead of amount of money, it isolates willingness to pay from the impact of the variation of ability to pay (wealth) between individuals. Willingness to pay is then measured by a scale from zero to one (proportion of wealth), which is in accordance with Hausman's (1995) position that the only possible correct way to compare bounded cardinal utility is the zero-one rule. In terms of subjective satisfaction, the conception of real value also has some ground, as the amount of satisfaction loss tends to be similar with an equal percentage decrease in wealth (see Bernouli, cited in Marshall, 1920, p. 111). To reiterate, the contention here is not that real value can accurately measure and compare willingness to pay or intensity of preference, but that real value is a far better approximate measurement than effective value (and thus price[4]), which weighs individual preferences by their ability to pay. By allowing some limited variability of measurement, a partial comparison in terms of real value is altogether viable[5].

Accordingly, marginal real value is defined as the maximum proportion of wealth an individual is willing to pay for an extra unit of good or service, whereas marginal effective value is

[4] At market equilibrium, price is equal to effective value at the margin, and thus is in practice used as a measurement of marginal effective value (as discussed above regarding the use of market price as the measurement of value).

[5] It is noted that the problem of comparability can be particularly controversial when subsistence is involved. For instance, a poor man who is willing to pay 90% of his wealth may harm his own subsistence, while a rich man paying 90% of his wealth may only turn him back into a middle-class man. Whether the real values measured in this case are even close enough to approximate and compare their intensities of preference, and whether the conception of real value needs modification are surely a potential subject of debate.

defined as the maximum amount of money an individual is willing and able to pay for an extra unit of good or service. Both marginal real value and marginal effective value are subject to the law of diminishing marginal value, i.e. presumably they both decline as consumption increases. As above, the two marginal values are related as: $\mathrm{W} \times \mathrm{MRV} = \mathrm{MEV}$, where W is wealth, MRV is marginal real value, and MEV is marginal effective value.

It is further assumed that marginal real value does not change with wealth, so there is a positive relationship between wealth and marginal effective value, i.e. a positive wealth effect on marginal effective value. There are two rationales behind this assumption. First, at least in the short run, a person's taste of does not seem to change with his or her wealth (Bourdieu, 1984). The formation of taste is influenced by a wide range of factors, including family background and class, but once the taste is formed, it is relatively stable. A sudden change in wealth is not likely to change one's preferences radically—"having a million does not in itself make one able to live like a millionaire" (Bourdieu, 1984, p. 374). The resulting changes in consumer behaviour (e.g. increase in conspicuous consumption) are then better interpreted as a result of the change in purchasing power, while the underlying pattern of preferences is intact. That being said, it does not mean that taste and wealth are unrelated. It is merely argued that the *change* of wealth and taste are not connected in the short run, and in the long run, it can take a considerable time to learn, acquire, and adapt to a new set of preferences.

Second, the idea of inferior goods is largely a myth. In economics, the concept of inferior good refers to a good for which demand decreases when income rises. The existence of an inferior

good would imply that the income effect may not be positive[6]. Although an inferior good is possible theoretically, it is not the only way to understand the relevant phenomenon in reality. It is true that when the income of a man increases, he tends to consume more meat and less crops (Stuart, 2009), and generally wants a larger house instead of a small one (Quigley, 1976). In these examples, crops and small houses can be seen as inferior goods. Yet, another equally reasonable interpretation is that the income effect has always been positive: the man simply consumes more crops converted into the form of meat, and demands more living space[7]. From this perspective, the notion of inferior good is merely a fiction and the wealth effect must always be positive[8].

Based on the conception of real value, it is then possible to develop a framework of real efficiency. First and foremost, real efficiency is defined as a state of allocation of resources in which every unit of a given stock of resources is allocated to the use of highest real value. In other words, it is impossible to reallocate resources to increase the total real value, as it is already maximized. Second, given the law of diminishing marginal real value, a real-efficient allocation of resources must satisfy the condition that real values are equal at the margin; otherwise, a real-location of resources from the use of lower marginal real value to the use of higher marginal real value would increase total real value. Third, with reference to the level of deviation from real

[6] In the sense that wealth is the sum of discounted incomes, income and wealth are two sides of the same coin, and income effect is the same as wealth effect.

[7] Examples of quantifying the quality of a good are not lacking. For instance, the quality of a comedy can be quantified as the number of laughs it produces (Logan, 2014).

[8] Despite the risk of premature generalization, there seems to be a general law that, other things being equal, the increase in one's income will lead to an increase in his consumption of resources (e.g. human and natural resources), to which all goods can be reduced (e.g. a house is a product of land, raw materials, and physical and mental labor). This paper, however, does not contend that the positive income/wealth effect is a law but simply an assumption.

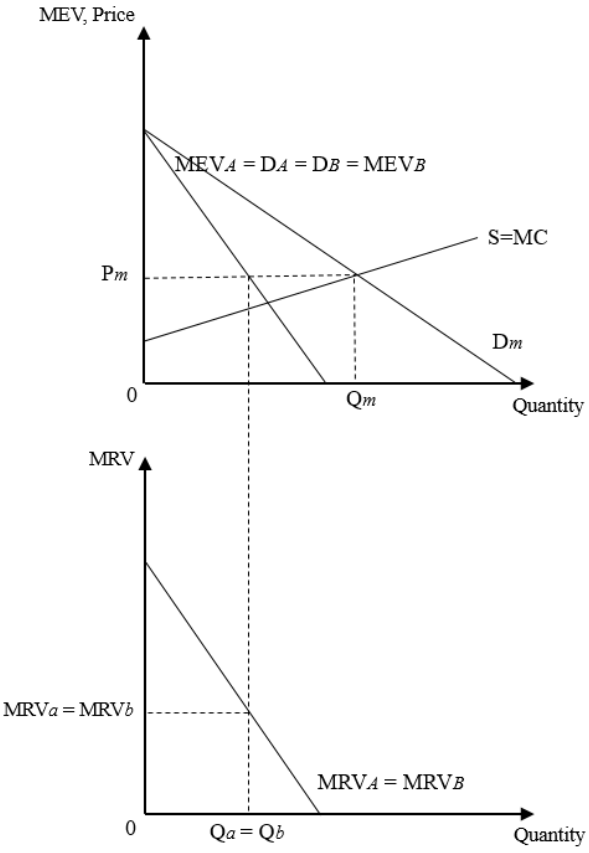

Figure 1. Equal Wealth

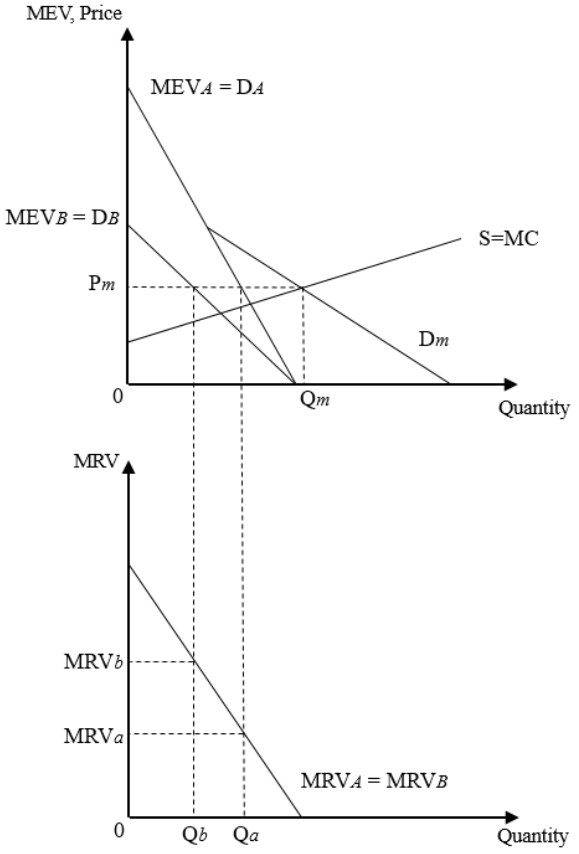

Figure 2. Unequal Wealth

efficiency, there is a spectrum of real inefficiency in terms of the level of discrepancy between marginal real values. Fourth, the technological level is taken as exogenously determined and held constant in the analysis.

In figure 1 and 2, the framework of real value and real efficiency is applied to a simple partial equilibrium model with two individual consumers *A* and *B*. For simplicity, it is assumed that both of them have the same marginal real value curve (MRV) for good *x*, so the difference between their marginal effective value curves (MEV), which are also their individual demand curves (D), only comes from the difference of their wealth. The market demand curve (D*m*) is derived from the horizontal summation of individual demand curves. Finally, there is the supply curve (S) which reflects the supplier's schedule of marginal cost (MC).

In figure 1, where wealth is equal between *A* and *B*, the marginal effective value curves of *A* and *B* are the same ($MEV_A = MEV_B$), and so are their individual demand curves ($D_A = D_B$). At the market equilibrium with price P_m and quantity transacted Q_m, *A* and *B* consume an equal quantity of *x* ($Q_a = Q_b$), which is decided by the condition that marginal effective value equals price (MEV = P). Most importantly, the marginal real values are equalized ($MRV_a = MRV_b$), indicating that the market equilibrium is real-efficient[9].

In figure 2, there is a redistribution of wealth between *A* and *B*: the wealth of *A* has increased while that of *B* has decreased. As a result, despite the same marginal real value curves ($MRV_A = MRV_B$), their marginal effective value curves and individual demand curves diverge, with MEV_A moving higher and MEV_B moving lower. At market equilibrium, *A* consumes more and *B* consumes less of *x* ($Q_a > Q_b$), and above all, the marginal real values are not equalized ($MRV_a < MRV_b$), indicating that a reallocation of *x* from *A* to *B* can increase the total real value of resources, so that the market equilibrium is not real-efficient. With a simple partial equilibrium model, the application of real value and real efficiency demonstrates that a real-inefficient allocation of resources can result purely from an unequal distribution of wealth.

Interestingly, the level of real-inefficiency is exactly equal to the discrepancy in affordability of *x* to *A* and *B*. At equilibrium, consumers decide the optimal quantity of consumption by the condition that marginal effective value is equal to price ($MEV = P$), and by definition, marginal

[9] It is important to note that the equal distribution of *x* is efficient simply because the marginal real value curves of *A* and *B* are assumed to be the same. An equal distribution of *x* is not necessarily an efficient allocation if the two marginal real value curves are different.

effective value is a product of wealth and marginal real value ($\mathrm{MEV} = \mathrm{W} \times \mathrm{MRV}$). It logically follows that at market equilibrium, marginal real value is equal to the affordability of the good concerned to the particular consumer ($\mathrm{MRV} = \mathrm{P} \div \mathrm{W}$). The discrepancy in affordability of *x* to *A* and *B*, therefore, reveals exactly the level of divergence between marginal real values of *A* and *B*, which by definition is the level of real inefficiency.

The limitation of space prevents this paper from going beyond the simple partial equilibrium model into more complicated analysis. Yet, it should be clear that the framework of real efficiency can be readily applied to other models which involve more than one good, thanks to its capability of comparing the relative values of different goods to different individuals.

2.4 Advantages and Limitations

The framework of real efficiency has two major advantages: (1) the avoidance of the use of utility of income; and (2) its compatibility with productivity concerns.

First, the framework of real efficiency avoids the use of utility of income. There is no lack of attempts to argue for a more equal distribution on a utilitarian basis, and a common argument is that a redistribution of income from the rich to the poor increases total utility since the poor have a higher marginal utility of income than the rich (Sen, 1973). Yet, it is unclear whether 'how much a person *A* values a £50 note' can be actually measured and compared interpersonally, particularly when money is usually in itself the scale of value. The individual schedule of marginal utility of income then tends to be arbitrary. The framework of real efficiency, which is a resources-based instead of income-based approach, avoids this problem. More importantly, a

framework based on marginal utility of income may have implications which would go completely against equality: if individual *A* derives double the utility which individual *B* derives from the same amount of income, the maximization of total utility would demand more income being allocated to *A* than *B* (Sen, 1973). In contrast, the positive relationship between wealth equality and efficiency is inherent in the framework of real efficiency.

Second, it is important to note that the framework of real efficiency does not deny the positive role of productivity—the Kaldor-Hicks sense of efficiency improvement. If a reallocation of resources from person *A* to *B* can increase the output of apples from two to three units, the reallocation is necessary for achieving real efficiency. Yet, despite the increase in productivity, the reallocation in itself does not guarantee improvement in real efficiency—not if it worsens the distribution of wealth. Furthermore, although real efficiency is defined at a given level of technological development, the framework can still take it into account. Other things being constant, a technological advance would increase the total real value of a given stock of resources by increasing its output. The actual gains, however, depends on the pattern of distribution. For instance, an increase in food productivity would result in a tiny increase in total real value if the extra food produced ended up in the rubbish bin of the rich. If the technological development contributes to an upward redistribution from the poor to the rich, the total real value may even decrease despite the increase in productivity. Arrow (1951) has criticized Kaldor and Hicks for seeking to compare different production levels independently of income distributions, and Little (2003) for trying to compare different distributions independently of total output. Agreeing with Arrow that any such

separation between production and distribution is likely to be invalid, this paper therefore attempts to incorporate both into a single framework of real efficiency.

It is admitted that the idea of real efficiency is still rudimentary and has several limitations: (1) the arbitrariness of partial comparison; (2) its distance from egalitarianism; and (3) the role of exchange value.

First, the use of partial comparison inevitably involves some arbitrariness in setting the limit of variability. The measurement of real value is admittedly loose and no implication should be drawn upon a small margin of inefficiency, but only a significant inefficiency that goes beyond a limited variability. For example, if a variability of 0.1 is allowed, the level of inefficiency is insignificant unless the discrepancy between marginal real values of a good to two individuals goes beyond 0.1. Yet, there is no objective standard as to where the line should be drawn. This may be left to a social choice with public deliberation, but it remains inevitably arbitrary in the sense that none is inherently better than the others.

Second, although the framework of real efficiency claims to reconcile efficiency with equality, it is still a long way from egalitarianism. If the question is asked 'equality of what' which the framework of real efficiency seeks to promote (Sen, 1980), it is the equality of 'votes' in revealing individuals' intensity of preference for resources. Accordingly, efficiency is evaluated with individual preferences weighted on an equal ground. However, this does not take into account the varying ability of people to derive capabilities from the same amount of wealth (Sen, 2010), and thus does not give special treatment to those who are at disadvantage (e.g. disabled

people). Thus the framework of real efficiency can hardly claim to be egalitarian in this sense.

Finally, it remains fairly unclear how exchange value should be understood in the real efficiency framework. The concept of real value is essentially a concept of 'use value' in the sense that it measures consumers' willingness to pay for the good for their own consumption and not for resale. This is all right as long as consumption and investment are not intertwined. However, some goods like housing have dual functions of both consumption and investment[10]. The behavior of investors for these goods is informed by a completely different logic from that of consumers. For one thing only, their willingness to pay for a good depends heavily on their perception of the prospect of resale, not its value for their own use. They may be willing to pay a high proportion of wealth for houses in which they would never live. While they may not use the good in a socially defined way (e.g. housing for living), it is unclear how these 'deviant uses' of, say, housing as 'a safe deposit box' (Fernandez et al., 2016) should be understood in the framework of real efficiency. However rather than being a limitation of the framework, this is actually an area that needs further exploration.

2.5 Interim Conclusion and Implications

In this section, we have seen that the separation of production from distribution and efficiency from equality in the Kaldor-Hicks framework of efficiency is fundamentally ungrounded. In fact, distribution is closely intertwined with production by influencing the pricing process,

[10] In principle, all goods can have both the functions of consumption and investment, whether durable (e.g. houses) or non-durable (e.g. whisky). The key is whether there is a liquid market for the good. In United States, for instance, there is a second market for sneakers of 1 billion USD (Weinswig, 2016).

which signals what is valuable to produce and what is not. Unless wealth is equally distributed, taking the market price as the measure of values is in effect the same as making an interpersonal comparison on an unequal ground. A framework of efficiency cannot reasonably compare the relative worth of goods and services to different individuals without somehow equalizing the 'dollar vote'. Therefore, a framework of real efficiency has been proposed, based on the maximization of total real value, which measures the real worth of a good or service to different individuals by the maximum proportion of wealth they are willing to pay for it, thereby hypothetically equalizing the 'dollar vote'. A number of implications can be derived from its application to a partial equilibrium model:

First, in a market economy, the symptom of real inefficiency is neither unequal distribution of the good concerned (as individuals may have different tastes), nor unequal distribution of wealth (as there may be price discrimination[11]). Instead, the inefficiency of unequal distribution lies in the discrepancy in the affordability of goods and services to different individuals. As discussed, with the condition of 'price equal marginal effective value' satisfied, the discrepancy in affordability must be logically equal to the discrepancy in marginal real values. The idea behind is also intuitively appealing: only when a good is equally affordable to different individuals can the differences in consumer behavior reveal only their differences in taste or preference.

Second, even with a well-functioning market, a real-inefficient allocation of resources can

[11] This holds only in a partial equilibrium model where some of the goods and services in the economy are concerned, as price discrimination may not be generalized. In general equilibrium where all goods and services are concerned, a perfectly real-efficient allocation of resources is conditional on an equal distribution of wealth, as the equalization of general affordability (P / W) would imply an equalization of wealth in terms of real purchasing power (W / P).

result purely from an unequal distribution of wealth. For instance, owing to severe global inequality, a vast quantity of crops is allocated to livestock feeding instead of feeding humans. The real inefficiency of this is evident from the huge discrepancy in affordability of crops between the starving in Sub-Saharan Africa and to the citizens of the United States, where much of it is not just fed to livestock, but is actually thrown away. The 'wastefulness' of livestock feeding and surplus food can now be conceptualized in terms of real efficiency loss. A redistribution policy that reduces inequality will improve real efficiency directly. Unlike the conventional claim (Okun, 1975), there is no tradeoff between equality and efficiency in this new framework.

Third, since market equilibrium may not be real-efficient despite the absence of traditionally-defined market failures, some government interventions can be justified on the grounds of real efficiency. For instance, a subsidy for the sector to which an insufficient amount of resources is allocated may change the pattern of production in a favorable direction towards real efficiency. That being said, it must be clarified that whether a specific policy should *actually* be implemented depends on a wide range of factors beyond the framework of real efficiency. It simply provides a new frame of reference for policy formulation other than that of market failures.

Finally, price discrimination by wealth can potentially be real efficiency-improving. Notwithstanding inequality of nominal wealth, price discrimination can reduce the divergence in affordability by quoting a low price for the poor. Technological development and policy changes that facilitate the practice may enhance real efficiency, particularly in the provision of public

goods[12]. While price discrimination by income is not uncommon in the business world, its most advanced form is found in Finland's fining system, where fines (e.g. traffic fines) are calculated on a *personal* basis with reference to a person's tax record as a constant proportion of income (Pinsker, 2015). That in effect makes the same crime equally 'affordable' to all citizens regardless of their incomes.

In the next section, we will look in detail at the housing situation in Hong Kong which will be analyzed with reference to the framework of real efficiency and its implications.

[12] Public good is a good whose consumption is non-exclusive, i.e. one's consumption does not reduce its availability to others. As a public good does not incur extra cost by serving an additional consumer, suppliers always have incentive to offer lower prices to poor consumers in order to maximize revenue.

3. The Inefficiency of Housing Inequality in Hong Kong

This section applies the framework of real efficiency to the analysis of housing inequality in Hong Kong. It first examines the situation of housing inequality there, which is then evaluated in terms of real efficiency. Policy implications will be briefly discussed at last.

3.1 The Inequality of Housing in Hong Kong

In examining the inequality of housing in Hong Kong, this paper puts the focus on the inequality of living space and rent affordability as opposed to the inequality of ownership and housing price affordability. Certainly, the housing ownership situation in Hong Kong is fascinating and housing prices are among the least affordable in the world (Frederik, 2017). Yet, as discussed in the last section, the framework of real efficiency concerns primarily the *use value* of goods and services. In the rental market, the distribution of ownership does not determine who would actually use the housing units and thus the inequality of living conditions, of which living space is a better approximation. Instead of housing price, the opportunity cost of living in a dwelling is rent, whether a person owns the dwelling or not[13]. Therefore, this analysis will approach inequality of housing in terms of living space and rent affordability.

While there are no official *household* statistics of living space, we can have an approximate sketch of the housing inequality in Hong Kong with *housing* statistics of floor area. First of all, there is a remarkable contrast between private and public housing unit in terms of floor area.

[13] If a person lives in his own dwelling, he would have to give up the opportunity of renting it out for an income, so ownership does not affect the opportunity cost of living in a dwelling.

Table 1. Composition of public and private housing stock by floor area, 2016

Public Housing size (m^2)	Share (%)	Private Housing size (m^2)	Share (%)
< 20	12.7	< 20	0.8
20-29.9	21.9	20-39.9	30.2
30-39.9	46..4		
≥ 40	18.9	40 - 69.9	48.9
		70 - 99.9	12.2
		100 - 159.9	5.6
		160 - 199.9	1.1
		200 - 279.9	0.9
		≥ 280	0.3
Total	**100.0**	**Total**	**100.0**

Sources: Housing in Figures 2016; Hong Kong Property Review 2017

Table 1 shows the composition of private and public housing units by size groups in 2016. It is clear that public housing units are in general smaller than private ones. While public housing units are mainly made up of dwellings smaller than 40 m^2 (81%), private domestic housing is largely composed of dwellings larger than 40 m^2 (69%). In the same year, 30.4 per cent of the total households live in public housing whereas 53 per cent live in private housing (Census and Statistics Department, 2017, Table 28). The divergence between households living in private and public housing constitutes a significant inequality of housing in Hong Kong.

Second, within the private housing sector the level of inequality is still substantial. As shown in Table 1, while 31 per cent of private dwellings are smaller than 40 m^2 and 48.9 percent are between 40 and 70 m^2, a significant 12.2 per cent are between 70 and 100 m^2 and 7.9 per cent are even larger than 100 m^2, which is roughly twice the median size of private housing units. On

Figure 3. Sub-divided units

Figure 4. Cage homes

Sources: LiteNews (Figure 3) & Atlas Obscura (Figure 4)

the other hand, there is a group of people still living in some tiny space of the city. In 2015, there were 25,200 private housing units sub-divided into 88,800 'sub-divided units', which are "formed by the sub-division of individual quarters into two or more units for rental purposes to more than one household" (Census and Statistics Department, 2016, p. 4), accommodating 87,600 households. For households living in these units, the average area per capita is 5.8 m^2 and 78.6 per cent of them live in units smaller than 13 m^2. A small fraction of these households even lives in bed-space apartments (commonly known as 'cage home') or canopy, with the most up-dated figure of 766 households in 2011 (Wong, 2012, Table 2).

Finally, the inequality of housing in Hong Kong is also embodied in the contrast between house and apartment. In 2016, there was a total of 18,571 houses in Hong Kong (Rating and Valuation Department, 2017, Table 9), which comprise "detached, semi-detached, or terraced building[s] that [contain] only one residential property". While it accounts for only 1.6 per cent of the total housing stock, households living in houses 'consume' disproportionally more land than households living in apartments where population density (population-to-land-area ratio) is

much higher[14]. Analogously to the case of livestock feeding, inequality manifests in the sense that the land used for building houses could be used to build apartment buildings that can accommodate more people with more living space than houses[15]. In light of the land it takes and the number of households it can accommodate, the production of houses, therefore, has implications for the distribution of land, a limited resource, which are particularly significant in places like Hong Kong where land value is sky-high.

The severe inequality of housing, however, does not *in itself* imply any real inefficiency in the housing sector, since the inequality could simply be a result of differences in individual preference. After all, if some people prefer living in small flats and spending their money elsewhere, whereas some others prefer living in large dwellings, the resulting inequality of housing should not be a problem at all. In terms of real efficiency, this means if the inequality of housing is solely due to differences in marginal real value curves, the inequality is altogether consistent with the condition of real efficiency. We thus cannot conclude anything about the real efficiency in the housing sector from the inequality of housing alone. Instead, as discussed, the symptom of real inefficiency manifests in the discrepancy in *affordability*, which reveals the discrepancy in marginal real value given that price equals marginal effective value. Thus, the following evaluates

[14] Ideally, this issue should be discussed directly in terms of residential or population density, but unfortunately, the relevant statistics are not detailed enough to lay the ground for a discussion of its inequality. So, the contrast between houses and apartment is employed as an approximate alternative to discuss the inequality of 'land consumption'.

[15] It is true that most houses are concentrated in New Territory, which is far from the central business district. Yet, there is still a significant number of houses located in the core of the city. For example, there are 1717 houses in the Southern District, 512 houses in the Central and Western District, 325 houses in Wan Chai, and 489 houses in Kowloon City, which are all close to or even inside the central business district. The land area taken by these houses is remarkable. Also, 47 per cent of the Hong Kong population in fact live in New Territory, so the remoteness of these houses may not be a valid reason to dismiss their distributional implication.

the level of real efficiency in the Hong Kong housing sector by measuring the level of inequality of housing affordability.

3.2 The Inefficiency of Housing Inequality in Hong Kong

The measurement of inequality of housing affordability is complicated by price discrimination. Very often, per-square-meter rents vary with the size of the housing units. While that could be due to differences in construction and land costs, there is also a possibility of price discrimination by self-selection (Phillips, 2005). For instance, if rich people typically consume larger houses, sellers can then segregate consumers according to the size of dwellings they are looking for, and may charge the rich consumers a premium as in the example of a first-class airline ticket. With price discrimination, the inequality of affordability may then be smaller (or larger) than the inequality of their ability to pay.

Since there is no publicly available information of the inequality or dispersion of housing affordability in Hong Kong, this analysis draws on partial statistics to try and get an idea about the situation. The result is summarized in Table 2, which shows the inequality of housing affordability between income decile groups, but a few things should be noted about the criteria used:

First, the inequality of post-tax household income is taken as an approximate measure of the inequality of 'wealth', as defined in the framework of real efficiency. As the only available statistics of monthly rent are based on average rental, the average income, instead of median income is used for the sake of comparability. Second, since the statistics of household income by income deciles is available in the 2011 census, but not the 2016 by-census, the year 2011 is used.

Third, as the analysis focuses on the private market, the table includes only households living in private housing, which thus differ between decile groups. Finally, the estimated average per-square-meter rent in different income decile groups is speculative. To begin with, the percentage of households living in private housing in each income decile group is estimated with the statistics of number of households by both income groups and types of housing. Based on the assumption that income is positively correlated with home size (Quigley, 1976), it 'assigns' housing units in descending size order to households in descending income order, so that the richest households live in the largest units and vice versa. The average per-square-meter rent in each income decile group is then calculated based on the average rent per square meter in each housing size group. While this involves some unrealistic assumption—the rich do not necessarily live in large dwellings, it is a reasonable approximation, and more importantly, points away from real inefficiency[16].

The findings shown in Table 2 are very interesting. First of all, average monthly income is positively associated with the percentage of households living in private housing, with an exception of the first income decile, in which 42.5% of the households live in private units—higher than that of the fifth decile. This is explained partly by the inclusion of retirees, who are economically inactive but may possess property or significant saving (Census and Statistics Department, 2012), and partly by the public housing policy which favors large married households and leave poor single people to the private market (Wong, 2015). But most importantly, there is a significant

[16] If large dwellings tend to be more expensive because of price discrimination, assuming the rich to live in large dwellings would increase the likelihood that the presence of real inefficiency is rejected. In other words, if real inefficiency is still confirmed under this unfavorable assumption, the result would be more undeniable.

Table 2. The inequality of housing affordability among all households, 2011

Income decile	Average monthly income (HKD)*	Living in private housing (%)	Housing size (m^2)	Average monthly rent (HKD/m^2)	Per-square-meter rent-to-income ratio (%)
1	1,940	42.5	< 40	248.6	**12.8**
2	6,300	29.6	< 40	248.6	**3.9**
3	9,870	36.3	< 40	248.6	**2.5**
4	13,770	39.0	< 40	248.6	**1.8**
5	18,040	42.0	< 40	248.6	**1.4**
6	22,810	47.8	< 40: 66.2% 40 – 69.9: 33.8%	241.3	**1.1**
7	28,730	55.1	40 – 69.9	227.0	**0.9**
8	36,810	64.5	40 – 69.9	227.0	**0.7**
9	50,320	76.1	40 – 69.9	227.0	**0.5**
10	120,370	91.9	40 – 69.9: 8.6% 70 – 99.9: 56.7% 100 – 159.9: 24.7% ≥ 160: 10.1%	292.8	**0.2**

Sources: Population Census, 2011; Hong Kong Property Review, 2012

* The income is post-tax income; HKD = Hong Kong dollar (exchange rate: roughly 1 GBP = 12.5 HKD in 2011).

proportion of people in each income decile living in private housing, so an analysis based on income deciles is possible.

Second, although there are five size groups of housings, basically all people in the bottom nine income deciles live in the smallest two groups of housings (< 40 m^2 and 40 – 69.9 m^2). This is, of course, an imprecise description of the distributional pattern, but at least it shows that the largest three housing groups (70 – 99.9 m^2, 100 – 159.9 m^2, and ≥ 160 m^2) represents a very small proportion, as the total number of housing units in these groups is even smaller than the number of households in the top income decile who live in private housing. On the one hand, this is

consistent with the notion that inequality is most obvious in terms of concentration of wealth and income in the top end (Piketty, 2014); on the other, the significant diversity of size within the stock of large units is in line with the observation that the top one income decile represents a highly heterogeneous group with remarkable inequality within itself (Roine et al., 2009).

Third, there is a surprising U-shaped relationship between average per-square-meter rent and the housing size[17]. On the one hand, the average rent in the smallest housing group (< 40 m^2), is higher than the second smallest group (40 – 69.9 m^2). There is also reason to suspect that the per-square-meter rent would go up further with smaller units *within* the smallest housing group, since there is evidence that the median per-square-meter rent of sub-divided units tends to be much higher than the average rent in the group[18]. On the other, the average per-square-meter rent is clearly positively associated with housing size in the other four size groups. Therefore, there is a general U-shaped relationship between per-square-meter rent and housing size—the rent falls with rising size in the first place, and rises afterwards. A possible explanation of the initial fall is that a tiny dwelling is a necessity good, for which *willingness* to pay (i.e. real value) is very high, while additional space is for comfort, for which willingness to pay at the margin (i.e. marginal real value) is much lower. So, the average price of living space (i.e. per-square-meter rent) declines as the dwelling gets larger. On the other hand, the largest three groups of housings, where increasing per-square-meter rent is found, probably accommodate mostly the rich in the top one

[17] The average per-square-meter rents in the five housing size groups are 248.6, 227, 269, 327.9, and 396.9 HKD respectively, with the smallest group in the front (Rating and Valuation Department, 2012, Table 12).

[18] The median per-square-meter rent of sub-divided units was roughly 400 HKD in 2014, whereas the average rent of in the smallest housing group was 316.8 HKD in the same year (Census and Statistics Department, 2015; Rating and Valuation Department, 2015).

income decile, whose income is much higher than the rest of the population. The rising per-square-meter rent may thus be explained by their significantly higher *ability* to pay and also the internal income hierarchy within the top one income decile. In a word, the U-shaped relationship between per-square-meter rent and housing size is probably a result of the combination of high *willingness* to pay for small dwellings and high *ability* to pay for large dwellings, which gives a high marginal effective value and thus price at both ends (P = MEV).

Finally, the discrepancy in housing affordability between income decile groups is remarkable. There is a 64 times discrepancy in per-square-meter rent-to-income ratio between the highest and the lowest income deciles. Even excluding the lowest income decile, in which measurement error may be more prevalent because of the inclusion of retirees, there is still an almost 20-fold discrepancy between the highest and the second lowest deciles. It is also noteworthy that the variation in per-square-meter rents actually worsens the inequality of housing affordability within the bottom nine deciles. People in the poorest five income deciles, who tend to live in dwellings smaller than 40 m^2, have to pay a higher per-square-meter rent than people in the middle four (i.e. sixth to ninth) income deciles, who tend to live in dwellings between 40 and 69.9 m^2. Meanwhile, the prominently higher per-square-meter rent of large housing units indeed reduces the affordability of housing to the people in the top decile, but how much of the relatively high rent can be attributed to price discrimination is uncertain, as the production and maintenance costs per square meter of floor area can be significantly higher for large dwellings than smaller ones. Even if it is wholly attributed to price discrimination, however, the reduction of affordability is

Table 3. Vacancy rate by housing size, 2011

Housing size (m^2)	Vacancy Rate (%)
< 40	2.3
40 – 69.9	4.0
70 – 99.9	7.7
100 – 159.9	9.2
≥ 160	10.2

Source: Hong Kong Property Review, 2012

still negligible given the very high income in the top one decile.

Putting all these findings together, it is then possible to shed light on the inefficiency of housing inequality in Hong Kong. Obviously, this inequality is *not* simply due to differences in preference. The extensive discrepancy in affordability suggests that the inequality of living condition is largely caused by the inequality of *ability* to pay. In other words, the inequality is fundamentally not a result of choice, but of inequality of economic power.

As argued, the discrepancy in affordability equals the discrepancy in marginal real values in a market economy. The remarkable discrepancy in housing affordability in Hong Kong thus suggests the presence of significant real inefficiency in the Hong Kong housing market. This cannot be explained away by measurement error in interpersonal comparison of marginal real value, since the discrepancy is so huge that even if the marginal real values of the top five income deciles are doubled and those of the bottom 5 deciles are halved, the discrepancy will still be significant.

The discrepancy in marginal real values implies that the total real value of resources will increase by reallocating resources from the use of lower marginal real value (i.e. large housing

units) to the use of higher marginal real value (i.e. small housing units). This does not necessarily mean that more small units should be produced—resources can be reallocated to produce larger 'small' units. This is exactly the same as the choice discussed in section 2 between building a combination of small and large houses on the one hand, and medium houses on the other. The statistics above suggest that, in the case of Hong Kong, moving towards a more equal pattern of medium houses would improve the real efficiency of the housing market. Instead of building large houses, it would be more real-efficient to spare the land and resources for the production of more and larger medium apartments. Therefore, the inequality of housing is not simply about justice or fairness, but also efficiency of resources allocation.

The real inefficiency of the housing inequality is more than a theoretical judgment—it reveals the real waste of housing resources. Table 3 shows the vacancy rate of housing units in different housing size groups. It is apparent that the vacancy rate tends to be much higher among large housing units than small ones, which reaches 10.2 per cent in the largest group. The vacancy of housing is as much a waste of resources as food thrown into bins, but the Kaldor-Hicks framework of efficiency says nothing about it as long as the consumers are willing and able to pay the price. In the framework of real efficiency, the high vacancy rate among large housing units can be understood as over-consumption by the rich. Since the cost of consumption accounts for only a tiny proportion of their wealth, they may consume to a point that the marginal real value is close to zero. In the case of housing, they may purchase houses as their 'second home', and in effect leave the houses unoccupied most of the year (Paris, 2010). Furthermore, with the rising

transnational mobility, it is not only the domestic rich who would own a second home, but also the global rich (Paris, 2006), so the real inefficiency and the resulting real waste of housing resources may actually come from external buyers. Anyway, it is a shameful waste of resources to produce large houses which remain unoccupied most of the time, while almost 200 thousand people are living in overcrowded sub-divided units (Census and Statistics Department, 2016). The framework of real efficiency makes sense of this 'wastefulness' and points to a reallocation of resources from large to medium housing units, which will improve the total real value of the limited land and other resources.

Finally, the case study of Hong Kong shows that price discrimination is a double-edged sword. Its effect on the discrepancy of housing affordability shows that, while price discrimination can potentially improve real efficiency by discriminating against the rich, it may also do the opposite if the sellers discriminate against the poor. The relatively high per-square-meter rent of small units, in effect, lowers housing affordability to the poor and aggravates real inefficiency.

3.3 Policy Implications

As demonstrated, a real-inefficient allocation of resources may arise purely from inequality of wealth despite a well-functioning market. This leads to the question about the role of the state in the framework of real efficiency, but this cannot be addressed within the space of this paper, so just two important points will be made about the case of Hong Kong.

First of all, a redistributive policy may not only be equality-enhancing, but also efficiency-improving. In the classical framework, policies like government subsidy is accused of distorting

the market price and thus allocation of resources. But consider a housing subsidy for the poor. This would increase their demand for housing, the price may go up, and the poor will probably move to larger dwellings. To claim that this is an inefficient over-supply is to assume that the original effective demand of the poor without the subsidy is the 'right' demand and the resulting market price is the 'right' price. This is clearly unfounded, since increasing the productivity and income of the poor would have the same effect but is not likely to be regarded as an inefficient change. In fact, a redistributive subsidy makes the poor more capable of signaling their preferences in the market and thus reallocate resources to uses of higher marginal real value. A large-scale housing subsidy to the poor might encourage the production of medium housing units and discourage the provision of sub-divided units and large houses. In light of the inefficiency of housing inequality in Hong Kong, a shift in this direction would improve real efficiency. The subsidy would therefore promote both equality and efficiency at the same time.

Second, the public provision of housings may or may not improve real efficiency. The provision of low-rent public housing is of significant scale in Hong Kong, and more importantly, tenants' affordability has been incorporated in the rent-setting mechanism, so that the rent is to certain degree linked to tenants' incomes (Yip & Lau, 2002). Yet, a critical difference between private market and public provision is that affordability cannot serve as a measurement of marginal real value in the latter case. Affordability as a measurement of marginal real value is based on the premise of P = MEV, which means consumers can consume as much as they want until price equals marginal effective value, but this obviously does not apply to publicly-provided

housing units. The rent may be affordable, but the tenant may still have to live in an overcrowded dwelling. Indeed, the marginal real value of the tenant for housing can possibly be as high as, or even higher than it would be in the private market. As Wong (2015) rightly points out, some public tenants may stay in their small public housing units simply for the sake of cheap rent, even though they could afford to pay for a larger dwelling in the private market. After all, in the public provision of housing the state replaces the market in making decisions about production and distribution, so whether it would improve real efficiency depends on whether the state can identify the real-efficient pattern of production and distribution better than the market. While market is deficient because of wealth inequality, there is no guarantee that the state will do a better job, as this will depend on a wide range of political and other factors.

4. Conclusion

"Wines and foods are rotting behind the crimson doors; Frozen corpses are decaying at the wayside," wrote Du Fu, a renowned Chinese poet 1200 years ago. This unfortunately still seems to apply today. While hundreds of millions are suffering, some are celebrating the 'efficiency' of their economy which supports their wasteful material lives. Thanks to the dominance of Kaldor-Hicks efficiency in economic thinking, it is widely believed that production and efficiency, as opposed to distribution and equality, is the only thing that matters in economics. In stark contrast, the core argument made in this analysis is that production and efficiency should not and cannot be separated from distribution and equality. As an alternative, a framework of real efficiency has been proposed to reconcile efficiency with equality by hypothetically equalizing the 'dollar votes' of everyone. The new framework has been applied to evaluate the housing inequality in Hong Kong in terms of real efficiency, demonstrating how the two are linked via the inequality of affordability. What has come to light here, however, is only the tip of the iceberg—the framework of real efficiency is a virgin territory with many issues unexplored, which call for further investigation, both theoretical and empirical.

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Bibliography

Arrow, K. J. (1951). Little's Critique of Welfare Economics. *The American Economic Review*, 41(5), 923–934.

Bourdieu, P. (1984). *Distinction: A Social Critique of the Judgement of Taste*. Harvard University Press.

Census and Statistics Department. (2012). *Household Income Distribution in Hong Kong*. Hong Kong: Census and Statistics Department, HKSAR.

Census and Statistics Department. (2015). *Housing Conditions of Sub-Divided Units in Hong Kong*. Hong Kong: Census and Statistics Department, HKSAR.

Census and Statistics Department. (2016). *Housing Conditions of Sub-Divided Units in Hong Kong*. Hong Kong: Census and Statistics Department, HKSAR.

Census and Statistics Department. (2017). *2016 Population By-Census: Summary Results*. Hong Kong: Census and Statistics Department, HKSAR.

Fernandez, R., Hofman, A. & Aalbers, M. B. (2016). London and New York as a Safe Deposit Box for the Transnational Wealth Elite. *Environment and Planning A*, 48(12), 2443–2461.

Frederik, B. (2017). Hong Kong Retains Title of World's Costliest Home Market. *Bloomberg.com*. Retrieved May 6, 2017, from https://www.bloomberg.com/news/articles/2017-01-22/hong-kong-tops-survey-of-world-s-least-affordable-home-market

Hausman, D. M. (1995). The Impossibility of Interpersonal Utility Comparisons. *Mind*, 104(415), 473–490.

Hennessey, K. (2014). Metaphors Matter: The Economy Is a Garden, Not a Pie. *George W. Bush Presidential Center*. Retrieved April 17, 2017, from http://www.bushcenter.org/publications/articles/2014/02/metaphors-matter-the-economy-is-a-garden-not-a-pie.html

Hicks, J. R. (1939). The Foundations of Welfare Economics. *The Economic Journal*, 49(196), 696–712.

Johnson, D. B. (1991). *Public Choice: An Introduction to the New Political Economy*. Mayfield Pub. Co.

Kahn, R. F. (1935). Some Notes on Ideal Output. *The Economic Journal*, 45(177), 1–35.

Kaldor, N. (1939). Welfare Propositions of Economics and Interpersonal Comparisons of Utility. *The Economic Journal*, 49(195), 549–552.

Lipsey, R. G. & Lancaster, K. (1956). The General Theory of Second Best. *The Review of Economic Studies*, 24(1), 11–32.

Little, I. M. D. (2003). *A Critique of Welfare Economics*. Oxford England ; New York: Oxford University Press.

Logan, B. (2014). Pay-per-Laugh: The Comedy Club That Charges Punters Having Fun. *The Guardian*. Retrieved April 16, 2017, from https://www.theguardian.com/stage/2014/oct/14/standup-comedy-pay-per-laugh-charge-barcelona

Lucas, R. E. (2002). The Industrial Revolution: Past and Future. *Lectures on economic growth*, 109–188.

Marshall, A. (1920). *Principles of Economics*. United Kingdom: Macmillan Press.

Okun, A. M. (1975). *Equality and Efficiency: The Big Tradeoff*. Washington, DC: Brookings Institution Press.

Paris, C. (2006). Multiple 'homes', Dwelling & Hyper-Mobility & Emergent Transnational Second Home Ownership, in: *ENHR International Conference, Llubijana, Slovenia, 2Á5 July*. Citeseer. Retrieved April 12, 2017, from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.116.657&rep=rep1&type=pdf

Paris, C. (2010). *Affluence, Mobility and Second Home Ownership*. New York, NY: Routledge.

Phillips, R. (2005). *Pricing and Revenue Optimization*. Stanford, Calif: Stanford Business Books.

Pigou, A. C. (1946). *The Economics of Welfare*. Macmillan and co., limited. Retrieved April 17, 2017, from http://203.200.22.249:8080/jspui/handle/2014/2412

Piketty, T. (2014). *Capital in the Twenty-First Century*. MA: Harvard University Press.

Pinsker, J. (2015). Finland, Home of the $103,000 Speeding Ticket. *The Atlantic*. Retrieved April 18, 2017, from https://www.theatlantic.com/business/archive/2015/03/finland-home-of-the-103000-speeding-ticket/387484/

Quigley, J. M. (1976). Housing Demand in the Short Run: An Analysis of Polytomous Choice, in: *Explorations in Economic Research, Volume 3, number 1*, (pp. 76–102). NBER. Retrieved April 16, 2017, from http://www.nber.org/chapters/c9079.pdf

Rating and Valuation Department. (2012). *Hong Kong Property Review 2012*. Hong Kong: Rating and Valuation Department, HKSAR.

Rating and Valuation Department. (2015). *Hong Kong Property Review 2015*. Hong Kong: Rating and Valuation Department, HKSAR.

Rating and Valuation Department. (2017). *Hong Kong Property Review 2017*. Hong Kong: Rating and Valuation Department, HKSAR.

Robbins, L. (1935). *An Essay on the Nature and Significance of Economic Science*. London: Macmillan Press.

Roine, J., Vlachos, J. & Waldenström, D. (2009). The Long-Run Determinants of Inequality: What Can We Learn from Top Income Data? *Journal of Public Economics*, 93(7–8), 974–988.

Sen, A. (1970). Interpersonal Aggregation and Partial Comparability. *Econometrica*, 38(3), 393–409.

Sen, A. (1973). *On Economic Inequality*. Clarendon Press.

Sen, A. (1980). Equality of What? *The Tanner Lecture on Human Values*, I, 197–220.

Sen, A. (2010). *The Idea of Justice*. London: Penguin.

Sen, A. (2017). *Collective Choice and Social Welfare: Expanded Edition*. Penguin.

Stiglitz, J. E. (2006). *Making Globalization Work*. W.W. Norton & Company.

Stuart, T. (2009). *Waste: Uncovering the Global Food Scandal*. New York: W. W. Norton & Company.

Weber, M. (1992). *Economy and Society*. Berkeley: University of California Press.

Weinswig, D. (2016). Sneaker Culture Fuels $1 Billion Secondary Market. *Forbes*. Retrieved April 18, 2017, from http://www.forbes.com/sites/deborahweinswig/2016/03/18/sneaker-culture-fuels-1-billion-secondary-market/

Wong, Y. R. (2012). Inefficiency and the Scourge of Small Public Housing Units. *Y C Richard Wong on the Political Economy of HK and China*. Retrieved May 15, 2017, from http://wangyujian.hku.hk/?p=1779&lang=en

Wong, Y. R. (2015). *Hong Kong Land for Hong Kong People: Fixing the Failures of Our Housing Policy*. Hong Kong: Hong Kong University Press.

Yip, N. M. & Lau, K. Y. (2002). Setting Rent with Reference to Tenants' Affordability: Public Housing Rent Policy in Hong Kong. *Journal of Housing and the Built Environment*, 17(4), 409–418.