Will Tax Credit Increase Housing Supply?
-Experience from US and Prospect for Australia[*]

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Abstract

While the world went through rapid urbanization in the last half century, house prices in many densely populated metropolitan regions are becoming increasingly unaffordable. As a result, many families turn to rental housing. However, the high rents in some markets also place significant burdens on low-income households. Thus, a lot of housing policies and strategies have been introduced by national and local governments to subsidize low-income families to improve their rental housing affordability.

The low-income housing tax credit program (LIHTC) in the USA and the national rental affordability scheme (NRAS) in Australia are such examples. Both policies aim to increase supply of affordable rental housing for low-income families. LIHTC finances the development of affordable rental housing through a tax credit system, whereas NRAS provides an annual tax-free incentive for investors to purchase new affordable dwellings and rent them at 20% below market rents to low-income families. LIHTC has been implemented in US for more than a quarter century since 1986, while NARS has relatively short history since 2008. However, whether these programs will increase the long-term housing supply, or will they simply "crowd out" other type of affordable rental housing remains an open question.

This paper first studies the long-term impact of LIHTC on housing supply, using the property level LIHTC data from 1986 to 2011, as well as other housing subsidy and housing supply data, including non-LIHTC rental subsidy programs, housing vouchers, housing permits, etc. An empirical linear OLS model is estimated to find the long-run sensitivity of housing supply to LIHTC program, controlling for other supply/demand variables. We find LIHTC has strong positive effect on overall housing supply.

Then we compare LIHTC to NRAS program and try to forecast the effectiveness of implementing NARS for increasing affordable rental housing supply, with limited historical data. Similar results show that NRAS has fully compensated for traditional public rental units decline.

The comparative study is important because it makes it possible to evaluate the effectiveness of such different approaches, and would enable decision makers to put the tax payers' money for better use. The research results will also be useful for national and local governments when designing low-income housing subsidy programs.

Contents

Introduction

Along with the economic and financial globalization in the last half century, there has been rapid global urbanization during the same period. According to a United Nations report (United Nations, 2012), the percentage of world population residing in urban areas has increased from 29.4% in 1950 to 51.6% in 2010. The trend has accelerated in the last 30 years after the most populous country in the world, China entered the global markets and became the new "world factory" in late 70's. China's urban population has increased from 19.4% in 1980 to more than half in 2012. Over the next 30 years, it is projected that the world urban population will increase to 70% in 2050. How to provide housing for these 2.5 billion new urbanites remains a challenging issue.

As a result of economic growth and rapid urbanization, house prices in many large cities have appreciated significantly in the recent history. Not surprisingly, housing affordability nowadays becomes a top public policy issue widely discussed not only in developed countries, but also in emerging market countries. Since 2008, the global financial crisis has slowed down the real estate markets and property values have fallen over the last six years in many developed economies, but it has not turned the unaffordability of housing or the high rent situation in many other countries, including China and India. Many nations include Australia, are still experiencing severe unaffordability issue, when house prices are compared to household incomes. Figure 1 is the results of a survey across US, UK, Australia, Canada, and New Zealand for rating of the housing affordability by nations, conducted by the *8th International Housing Affordability Survey* (Cox and Pavletich, 2012), where rank 3 or under indicates affordable and 5.1 or above indicates severely unaffordable. Australian families appear to be seriously struggling with housing unaffordability. The 'median multiple' - the median house price compared to median household income − of Australia's national unaffordability was still severely unaffordable at 5.6.   In particular, Figure 2 shows that the median multiple of Sydney and Melbourne are 9.2 and 8.4, ranked 3rd and 4th the most unaffordable metropolitans housing market in 2011. Low income and government regulations were identified as the two most likely potential causes behind the affordability problem (Feldman, 2002). Restrictive land-use regulations and governments' lack of consideration for economic fundamentals are the main driving factors of deteriorating affordability (Cox and Pavletich, 2012). A consistent under-supply of new properties compared to demand for housing in Australia is an example. Vacancy rates have fallen in all Australian cities to below the bench market level of 3 per cent. In the NSW, the supply of housing is estimated to lag demographic demand by 267,500 dwellings by 2020 (Dale, et al., 2011). The issues of affordability are not just a housing problem affecting individual families today and future generations, but also have an impact on economy as a whole and generate social consequences (NHPAU, 2009).

Housing Affordability Ratings by Nation: All Markets						
Nation	Affordable (3.0 & Under)	Moderately Unaffordable (3.1-4.0)	Seriously Unaffordable (4.1-5.0)	Severely Unaffordable (5.1 & Over)	Total	National Median
Australia	0	0	7	25	32	5.6
Canada	9	19	1	6	35	3.5
China (Hong Kong)	0	0	0	1	1	12.6
Ireland	2	3	0	0	5	3.3
New Zealand	0	0	3	5	8	5.2
United Kingdom	0	1	12	20	33	5.1
United States	117	64	16	14	211	3.0
TOTAL	128	87	39	71	325	

Figure 1: Housing affordability rating by nation
(Source: *8th Annual Demographia International Housing Affordability Survey: 2012*)

Rank	Major metro market	Median multiple
1st	Hong Kong	12.6
2nd	Vancouver	10.6
3rd	Sydney	9.2
4th	Melbourne	8.4
5th	Plymouth and Devon	7.4

Figure 2: Most unaffordable major metropolitan housing markets
(Source: *8th Annual Demographia International Housing Affordability Survey: 2012*)

Although affordability problem for home ownership tend to receive the most media attention, the largest group of households experiencing such problems are households in the private rental market. Housing affordability for renters refers to the relationship between rents and incomes (O'Flynn, 2011). High housing costs create financial hardship for low income families who are not be able to sustain their tenancy as they leave little budget for household necessities (Burke and Ralston, 2003). The financial hardship can also affect children's education and place stress on already fragile families to accelerate relationship breakdown with all the associated personal and social costs (Gabriel, et al., 2005). Governments play a crucial role to finance the low- and moderate-income families and improve their housing affordability through formulating housing policies. Many different public housing subsidy programs have been implemented in the developed countries. To study their successes and failures will help governments in the emerging markets to avoid the same mistakes gain, and implement housing policies more efficiently.

For example, public housing subsidy policy in the United States has gone through three stages: public housing, housing vouchers, and low-income housing tax credit.

Public housing involves housing units directly developed, allocated, or managed by the government. These housing units are sold or rented to low-and middle-income families at below-market prices. This policy originated in Britain in the late 19th century, and gained popularity in major European countries in the mid-20th century. British government's initial purpose is to provide stability to the ordinary working class with long lease term and relatively spacious, high-

quality housing in the 1950s during to the post-war reconstruction period. To accommodate rapid population growth after WWII, the program went through substantial growth.

United States started build public housing units in the 1930s, during the great depression era. During 1935 and 1959, about 800,000 subsidized low-income housing units were built. In the 1960s, construction of public housing units gained steam, partially due to UK success, and partially due to the civil rights movement. During 1960 and 1980, roughly 1.3 million housing units were constructed for moderate income households (Murray 1999).

There is no doubt that this policy solved the housing problems for many people at that time. However, due to the tight schedule, cost control, and use of immature building materials and technology, many of the buildings encountered costly maintenance issues in their later life. From a social perspective, because of the concentration of low-income households in the public housing units, which are mainly located in the central urban areas, centralization of poverty led to high crime rates in city centres, proliferation of drugs, and deterioration of the public school education. Partially due to these social issues, many middle class families moved from the central urban areas to the suburbs, leading to the suburbanization of many metropolitan areas. (Find papers addressing this.)

From an economic perspective, when the government is directly involved in the development, allocation, and management of these public housing units, it is prone to inefficiency, rent-seeking and corruption. For example, one recent Washington Post article reported that according to a recent survey, there are 8,000 public housing units in Washington, DC which are managed by the municipal government, but the number of applications is 60,007. Families seeking a one or two-bedroom units need to wait 20 years before admission.

In order to solve the above mentioned social problems and inefficiencies in government-managed public housing projects, the United States and many European governments turned to monetary-based subsidy, i.e., housing vouchers. They're mainly offered to low-income families, and can be used to pay rents. Vouchers may not be transferred, sold or used for other any other purposes besides paying for rental housing. These housing vouchers can be used for any private or commercial rental housing, as long as the landlord is willing to accept them. Landlord can later go to the government and have these housing vouchers reimbursed. Housing vouchers give low-income families the power to choose the neighbourhood, live in the community with less social problems. However, housing vouchers could also pose other issues. For example, in areas where housing supply elasticity is relatively low, issuing housing vouchers would make the overall rent rise, to the detriment of those renters who do not qualify for housing vouchers, and landlords become the primary beneficiary.

To solve this problem, it is necessary to increase the housing supply for low-income people. In 1986, the Reagan administration launched a new housing subsidies program, to attract private capital into providing rental housing to low-income households, which is the low-income housing tax credit (LIHTC) program. The idea of this policy is to design a tax credit system to incentivize private fund for the construction of low-income rental housing, and increase the overall rental housing stock. The developers of LIHTC projects apply for the credits from state housing finance agencies for the construction of multi-family rental housing, and ensure that part

of those housing units will be rented to low-income families at lower than market prices. In return, the developer's profit will get tax credit. The developers can sell the tax credit to finance the projects, so that any tax-optimizing companies and individuals can purchase these tax credits, regardless of whether they want to engage in rental business. Sale of the tax credit can sometimes account for one-third of the developer's equity interest. Since its inception in 1987, more than 2.2 housing units have been constructed, acquired, or rehabilitated for low-income rental housing.

Based on the seemingly success of LIHTC, other nations start to launch similar public rental housing subsidy programs to spur "investible" production of low-income rental housing. The national rental affordability scheme (NRAS) in Australia is one such example. Starting from 2010, NRAS provides an annual tax-free incentive for investors to purchase new affordable dwellings and rent them at 20% below market rents to low- and moderate-income families.

However, these tax incentive programs have been under criticism since many advocates of public housing argue that this new policy merely "crowd out" other low-income rental housing units, and does not really increase the overall supply of housing. This paper is trying to address this critique.

This paper first studies the long-term impact of LIHTC on housing supply, using the property level LIHTC data from 1986 to 2011, as well as other housing subsidy and housing supply data, including non-LIHTC rental subsidy programs, housing vouchers, housing permits, etc. An empirical linear OLS model is estimated to find the long-run sensitivity of housing supply to LIHTC program, controlling for other supply/demand variables. Then we compare LIHTC to NRAS program and try to forecast the effectiveness of implementing NARS for increasing affordable rental housing supply, with limited historical data. The comparative study is important because it makes it possible to evaluate the effectiveness of such different approaches, and would enable decision makers to put the tax payers' money for better use. The research results will also be useful for national and local governments when designing low-income housing subsidy programs.

Literature Research

Debates over the effectiveness and efficiency of the LIHTC have almost never stopped since its inception in 1987. The LIHTC has been viewed a success program (McClure, 2000) in that it has generated many affordable rental housing units that are now occupied by low- and moderate-income households. Malpezzi and Vandell (2002) found that the LIHTC units do not conclusively increase total housing units. Sinai and Waldfogel (2002) found that government-financed units raise the total number of units in a Census place, although there is some mild crowding out effect (three units built for every two crowded out). Eriksen and Rosenthal (2010) argues that almost 100% of the time LIHTC development will be offset by reduction of unsubsidized rental units.

Smith, et al. (2002) developed metrics to evaluate credit effectiveness of the LIHTC credit system. They claimed the credit system in the LIHTC is successful by listing a number of success factors which include durability, utilization, market share of federal affordable housing resources, stakeholder support, permanence, congressional support, demand-supply and market penetration in new affordable housing production. Evidences were provided such as the credit shares 60-75 per cent of all new affordable housing production properties and over 99 per cent of all annual credits are allocated; this implies that the LIHTC program substantially adds to the supply of affordable housing in the US.

Regarding NRAS, Gilmour (2010) argued that in Australia, due to limited funding through the scheme, most new properties have been built in middle and outer suburbs, and larger regional towns, where land prices are lower. This might not greatly help urban renters who are facing the burden of high market rents. In addition, Gilmour and Milligan (2008) suggested it is difficult to make a direct comparison of the effectiveness of the two policies because of fundamental differences in the income distribution and underlying welfare support systems in the two countries.

On the efficiency perspective, Stegman (1991) suggested that the tax credit is a poorly designed, very inefficient and complex subsidy delivery mechanism. Case (1991) also criticized the program for giving excessive subsidies to investors, beyond what is required to induce them to develop the properties. In addition, the program has been criticized for requiring additional layers of subsidy to leverage investment and for providing benefits to developers in excess of the amount necessary to induce them to invest (McClure, 2000).

Leviner (2004) has also argued that subsidized construction largely displaces unsubsidized units with no substantial net gain to the affordable housing supply due to (a) the subsidy is directed at projects which would have been produced anyway by the private market; and (b) the LIHTC subsidization of new construction could make it much less economically viable to convert some of these older properties to the use of low-income households.

To encourage efficiency, the LIHTC program sets up a competitive and transparent tax credit budding system. The LIHTC is a market regulating system with tax credit syndicators monitoring project compliance on behalf of institutional investors to protect their entitlement to tax credits (Gilmour and Milligan, 2008). However, Leviner (2004) argued that the production of

housing under the LIHTC creates inefficiency because (a) the subsidizing new construction might produce housing that is unfit for low-income households since the new rental properties under the program too small for larger households; (b) supply subsidized housing may be of higher quality and higher costs which can spread the costs across a larger number of units to the potential tenants. Thus, the LIHTC funds are spent on new construction is the most expensive source of supply and the capital invested in the new production could have been more usefully invested elsewhere. The inefficiency of the LIHTC were also related to the administrative costs for example 'layering' practice where the LIHTC covers only part of the total costs of affordable housing projects in which several different sources of capital must be packaged together to make the project viable. The process of financing increases the program's transaction and administrative costs (Leviner, 2004). Moreover, evidences suggested the LIHTC is inefficiency because the LIHTC provides profit for the investors rather than an increase in the supply of affordable housing since developers exchange their tax credits with investors to raise capital and receive less than full value of the credit in equity.

The NRAS has been implemented through funding rounds and has effectively increased the standard residential net income return in Australia from about 2 per cent for not-for-profit housing providers to 5 per cent (James, 2010). There were 16.7 (6,772 incentives) per cent allocated to the NSW and 27.8 (11,284 incentives) per cent to the QLD indicates the disproportions of geographic distribution of the NRAS grants. This evidence suggests that the NRAS creates disincentives for investing in Australia's most unaffordable markets where the cost of land and development is relatively expensive. In addition, Gilmour (2010) argued that most NRAS incentives have been awarded to community housing organisations, with only a minority going to private investors. Around 20 large housing groups have grown in capacity and regularly win NRAS incentives.

Our paper will address the effectiveness of LIHTC and NRAS programs, i.e., whether it increases total per capita housing units, and whether it brings down rental price. We do not address the efficiency of these programs.

LIHTC in Retrospect

The Low-Income Housing Tax Credit (LIHTC) was introduced under the Tax Reform Act of 1986 (TRA86) and was made permanent in 1993 by the US federal government to provide incentives for the utilization of private equity in the development of affordable rental housing for low-income households. The program is financed by the federal government but administered by state housing authorities to subsidize private developers undertaking the acquisition, construction, and/or rehabilitation of rental property. Since 1986, the program has provided nearly 2.4 million affordable rental homes and creates approximately 95,000 jobs annually. According to the President's Economic Recovery Advisory Board (PERAB) (2010), the LIHTC program would cost the federal government $61 billion in lost tax revenue from participating corporations from 2008-2017.

The LIHTC provides opportunities for corporations and individual investors to take federal tax credits to invest affordable rental housing. The tax credits financing is mainly for new construction and rehabilitation projects. Other projects such as housing for families, special

needs tenants, single room occupancy, the elderly and "high-cost and difficult-in-develop areas" are also funded. Investors earn dollar-for-dollar credits against their federal tax liability and get tax benefits from losses. The LIHTC program requires a minimum affordability period of 30 years (i.e., a 15-year compliance period and subsequent 15-year extended use period) (HUD, 2010). In general, tax credits are received over the first 10 years of operation, but some tax credits are recaptured if the project does not comply for 15 years.

In exchange, rents are set at a level affordable to households with modest incomes. The tenants (families) must earn less that the threshold income which is 20/50 or 40/60 rules based on the US Department of Housing and Urban Development (HUD) median income data adjusted unit size (HUD, 2010). At least 20 per cent of the apartments in each development must be rented to households with incomes below 50 per cent of the area median; at least 40 per cent of the apartments in each development must be rented to households with incomes below 60 per cent of the area median income (Tax Policy Center, 2010). Under the federal law, rents must be affordable to these target income groups for at least 15 years, after which developers can charge market rents.

The LIHTC is structured as a partnership and syndication, i.e., developers typically own 0.01% to control and operate the project, and 'sell' the credits by entering into limited partnerships with an investor who has limited voting rights, with 99.99% of the profits, losses, depreciation, and tax credits being allocated to the investor as a partner in the partnership (Gilmour and Milligan, 2008). Figure 3 depicts the relationship between the developer and investor(s).
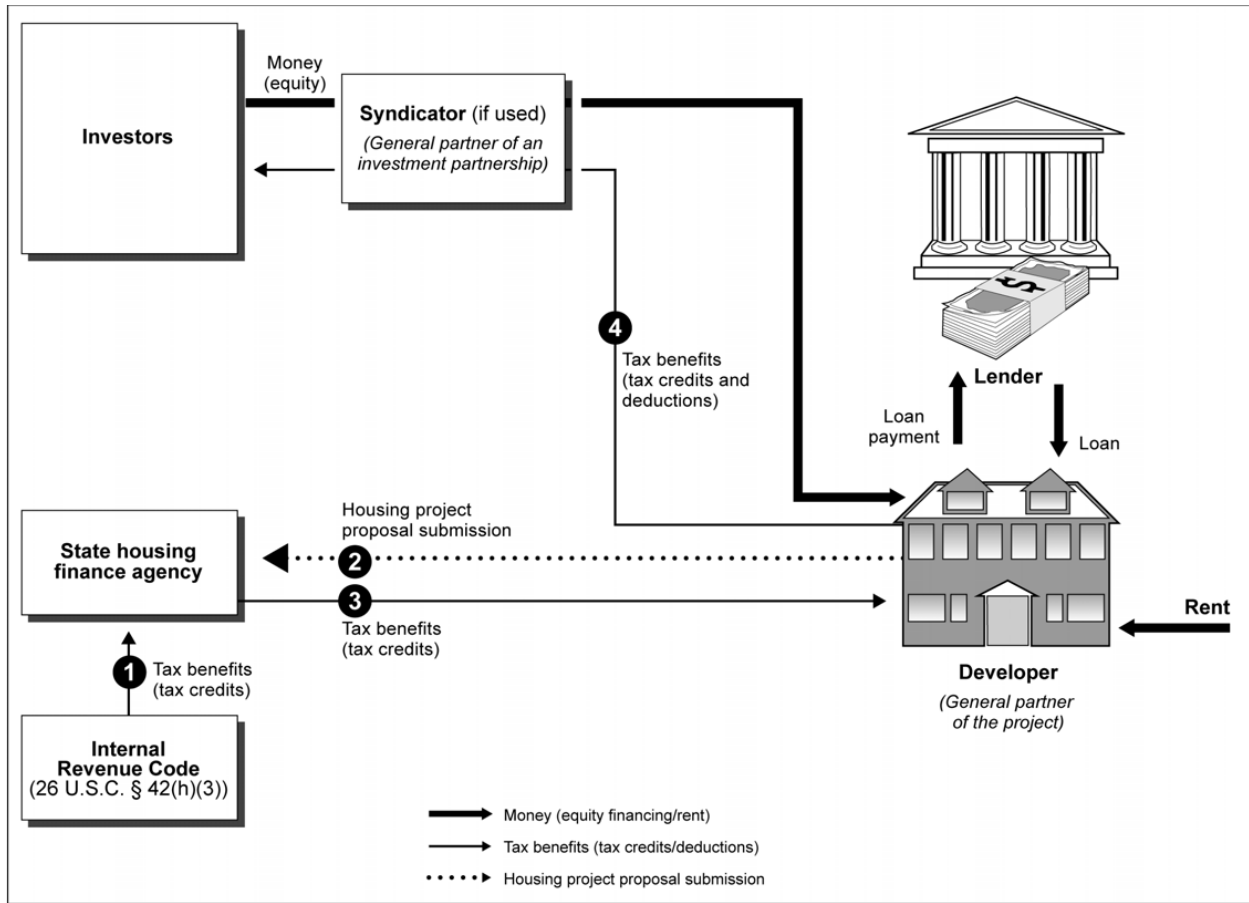
Figure 3: The LIHTC structure of partnership and syndication
Source: GAO (2012)

There are two types of tax credits, 9% tax credit and 4% tax credit. The '9 per cent tax credit' is a standard kind of credit, i.e., developers may claim tax credits over 10 years equal to the present value up to 70 per cent of the 'qualified basis' for new construction and major rehabilitation projects. The '4 per cent tax credit is awarded at 30 per cent of the present value of the 'qualified basis' when project is financed by tax-exempt bonds (Tax Policy Center, 2010). The 'qualified basis' is worked out by finding the developer's cost, i.e., the entire project costs excluded ineligible costs such as land acquisition, finance fees, tax credit syndication fees, and marketing or administration costs, and then multiplying it with an applicable rate (tax credit fraction). The tax credit applicable rate is published monthly. Thus, the total tax credit for a project is then determined by qualified basis times the applicable rate times 10 years.

There are many details in the application of the LIHTC in term of eligible projects, tenant requirements, and credit calculations. Whether the credit actually induces much more additional housing development for low-income families is a debatable question since the LIHTC program is considered by some as "inefficient and complex" (Tax Policy Center, 2010). A survey found that most developments needed at least one additional layer of subsidy to finance the projects in Missouri development. In addition, another study found that a $1,000 tax credit produces only $590 worth of housing. Nevertheless, the LIHTC program has become the nation's primary

mechanism for encouraging the production of housing and is an extremely effective tool for developing millions of affordable rental housing and has helped meet a critical affordable housing shortage over the two decades (Wallace, 1995 and Katz, et al., 2003).

The following table shows that there have been 35,371 properties put into service since the program launch till 2010, with close to 2.23 million units, of which 1.99 million are low-income units. Of all the units, about 1.16 million are new construction, 0.75 million are acquisition and rehabilitation, and the rest are mostly missing program types.

Year PIS	#Projects	# Units	Low Income Units	New construction	Acquisition and Rehab	Both new construction and A/R	Existing	Missing
Unknown	2,245	128,372	101,749	22,456	23,412	170	1,166	81,168
1987	705	18,496	16,636	8,759	6,448	-	804	2,485
1988	1,533	39,376	36,879	15,094	16,644	42	3,259	4,337
1989	1,511	48,876	43,666	19,218	19,728	229	2,975	6,726
1990	1,287	50,555	43,393	26,728	18,150	22	307	5,348
1991	1,378	52,299	46,877	25,017	22,749	156	372	4,005
1992	1,414	50,987	45,993	26,198	15,660	382	227	8,520
1993	1,457	65,172	58,318	31,544	20,422	405	707	2,094
1994	1,477	70,259	66,695	34,069	22,241	303	372	13,274
1995	1,562	91,461	83,925	54,925	27,890	986	1,077	6,583
1996	1,462	92,746	85,269	52,845	30,421	1,059	673	7,748
1997	1,405	93,199	82,832	52,784	31,971	1,617	744	6,083
1998	1,383	99,882	87,716	57,455	33,454	1,004	722	7,247
1999	1,587	122,792	109,701	70,611	41,449	1,471	1,411	7,850
2000	1,411	108,424	97,484	63,095	39,054	426	219	5,630
2001	1,477	111,339	101,012	64,970	39,467	1,285	351	5,266
2002	1,407	115,257	101,329	63,020	33,889	1,544	1,024	15,780
2003	1,576	134,290	116,835	83,497	36,570	2,271	464	11,488
2004	1,591	137,140	117,544	76,291	43,514	2,086	441	14,808
2005	1,685	138,991	122,445	75,874	45,324	1,525	227	16,041
2006	1,566	125,864	116,624	67,218	48,046	2,702	954	6,944
2007	1,476	117,061	108,223	60,381	49,394	1,288	946	5,052
2008	1,235	92,686	82,496	44,746	34,641	916	2,947	9,436
2009	962	72,699	63,461	40,791	21,208	1,380	993	8,327
2010	579	56,352	50,185	21,435	26,955	359	496	7,107
Total	35,371	2,234,575	1,987,287	1,159,021	748,701	23,628	23,878	279,347

Table 1. LIHTC Project Summary

The next two charts demonstrate the total LIHTC units per 1,000 population vs. total housing units per 1,000 and total multi-family units per 1,000 population.
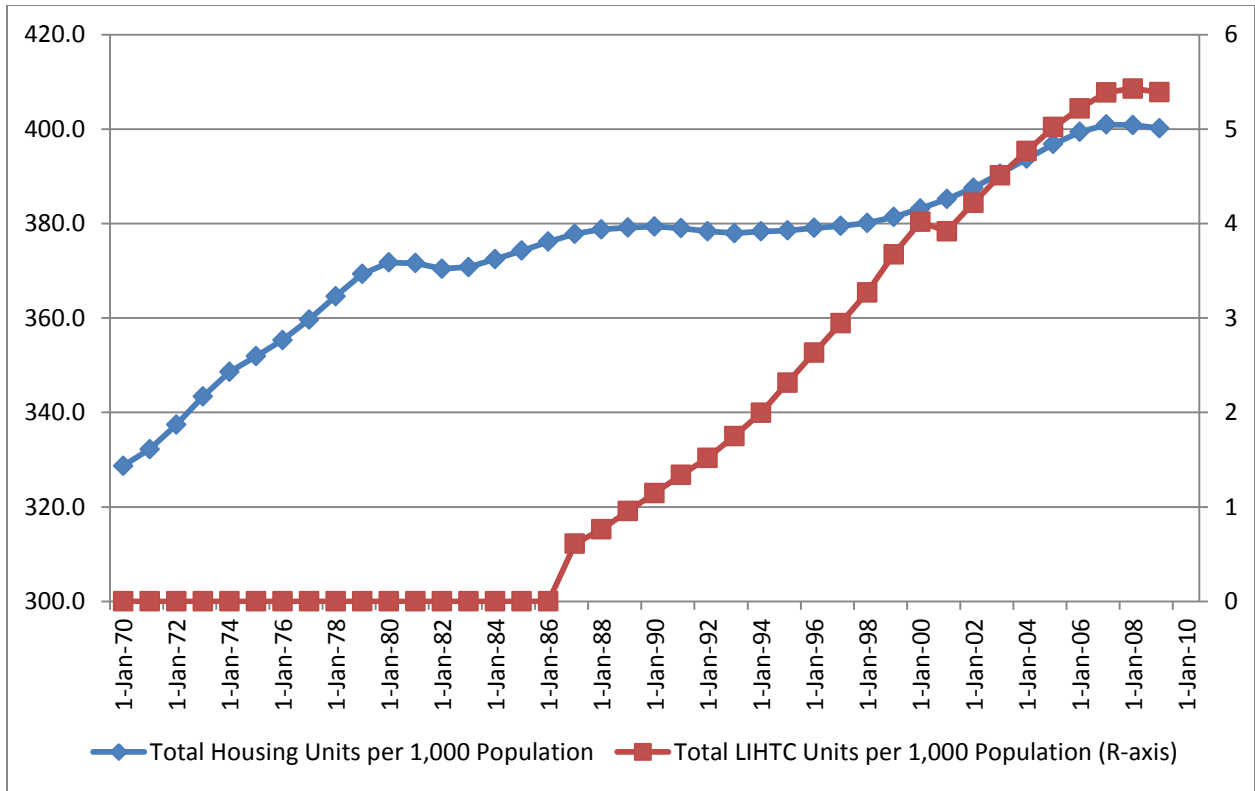
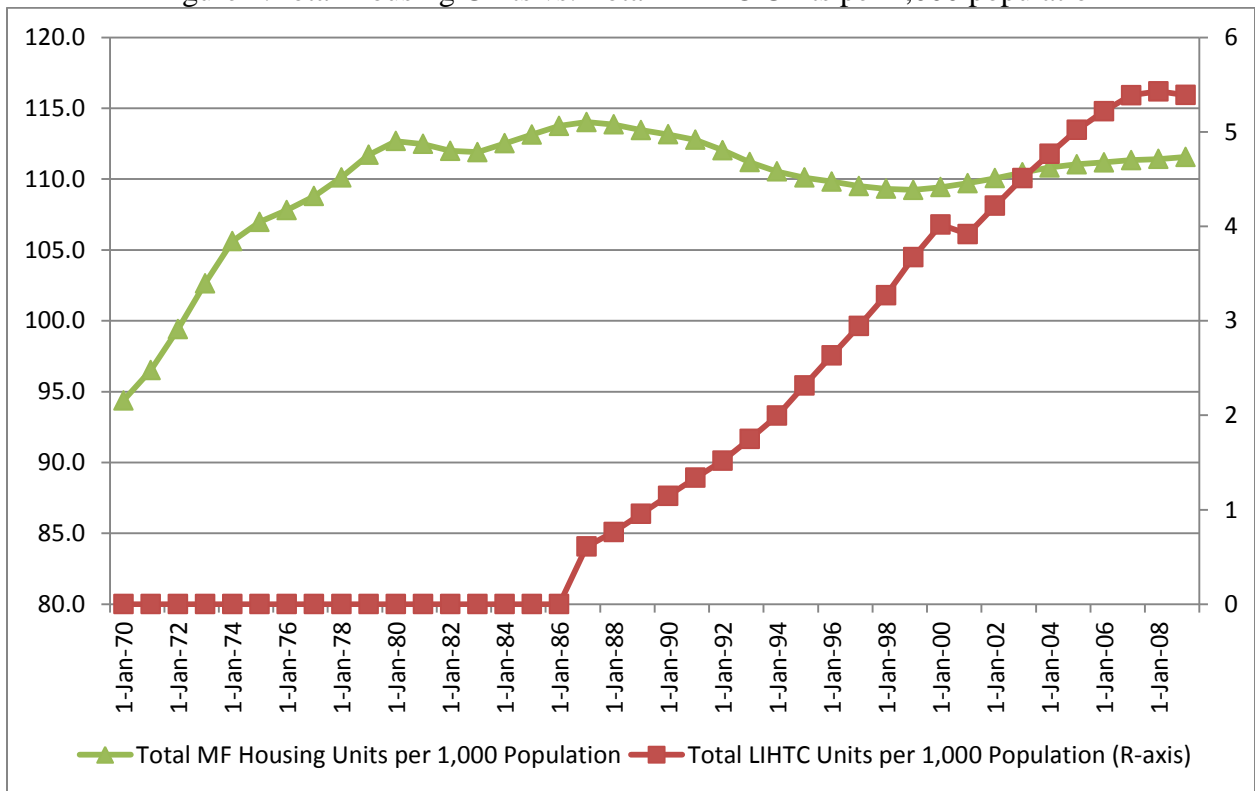Figure 4.Total Housing Units vs. Total LIHTC Units per 1,000 population

Figure 5.Total Multi-Family Housing Units vs. Total LIHTC Units per 1,000 population

A Simple Reduced Form Model for Total Housing Supply

Similar to Sinai and Waldfogel (2002), and Malpezzi and Vandell (2002), we assume the total housing units Q is the sum of subsidized housing supply of L_S and unsubsidized housing supply of Q_S.

$$Q = L_S(Y, N, D, V, C, R, H) + Q_S(Y, N, D, V, C, R, H; L_S)$$

Where each supply function is determined by the following demand and supply variables:

Y is the income and poverty measures;

N is the population;

D is the demographics;

V is the supply of demand-side subsidies;

C is the construction cost;

R is the regulatory environment;

H is the housing market condition.

Because the subsidized housing supply of L_S and unsubsidized housing supply of Q_S are substitute goods. The production of Q_S is also affected by L_S.

Following Malpezzi and Vandell (2002), we are more interested in the population-adjusted housing supply, instead of the absolute units count. Thus the total housing supply can be re-written as:

$$\frac{Q}{N} = f(Y, N, D, C, R, H; \frac{L_S}{N}, \frac{V}{N})$$

This is our core reduced form regression model.

Data Description

We get the LIHTC property data with units count from HUD's LIHTC database. The units count data from HUD's other supply and demand subsidies are retrieved from HUD's Assisted Housing dataset from 2004 to 2009. The 2008 data was not retrieved because of web site query errors.

Other data are collected from public sources. Population, housing stock, vacancy rates, racial and ethnic composition, income and poverty rates are based on Census' data.

The following table shows the summary data for different states in 2009, which is the last year we have reliable non-LIHTC housing supply subsidy (public housing, section 8 new construction and rehabilitation, section 236 projects) and housing demand subsidy (section 8 certificates and vouchers). The data shows pretty wide discrepancy among the statistics reported. For example, Utah, the state with the least housing units per 1,000 population (344.1), also has one of the lowest housing subsidy units (combined demand and supply of 11.2, second only to Arizona's 9.7 units). On the other hand, District of Columbia, has the highest count of per capita housing units, and also the highest housing subsidy unit counts in all three categories: LIHTC, non-LIHTC supply, and demand subsidy. The national mean of LIHTC units, non-LIHTC supply subsidy units, and demand subsidy units are 5.3, 7.1, 9.2, respectively. Thus although LIHTC has gained a lot of market share, it has not passed other type of supply subsidy, and is still lagging the penetration of housing vouchers. Of course, these subsidy programs are not exclusive, and

we have observed many times, developers/investors are combining the subsidy programs (dubbed as "subsidy layers") to maximize the eligible dollar amount from the federal government.

State	Total	Multi-Family	LIHTC	Non-LIHTC Supply Subsidy	Demand Subsidy	LIHTC in 5+ MF Building Permit (1987-2011)
Alaska	408.9	105.2	4.3	3.2	7.9	34%
Alabama	390.4	74.3	5.2	11.7	8.1	27%
Arkansas	394.1	70.2	4.5	8.1	10.2	19%
Arizona	395.1	92.3	3.6	2.1	4.0	13%
California	354.3	113.8	5.8	3.3	9.8	19%
Colorado	424.3	111.3	5.6	4.7	7.3	13%
Connecticut	412.6	143.9	3.0	10.5	13.5	14%
District of Columbia	497.3	303.6	26.3	27.7	33.5	15%
Delaware	411.0	79.6	6.7	7.4	7.4	26%
Florida	434.8	145.7	6.2	3.9	6.7	14%
Georgia	386.0	87.9	8.0	7.4	7.4	13%
Hawaii	384.6	155.6	3.1	7.1	10.8	12%
Iowa	421.7	82.5	4.5	4.9	8.8	22%
Idaho	384.3	60.3	4.2	3.0	4.8	37%
Illinois	402.5	138.8	4.9	8.9	9.7	19%
Indiana	410.3	81.6	5.8	7.0	8.2	11%
Kansas	413.7	75.4	6.3	6.7	5.8	34%
Kentucky	391.3	82.1	3.5	10.7	9.1	24%
Louisiana	377.7	77.7	3.3	8.2	11.7	41%
Massachusetts	426.5	179.0	4.8	12.3	17.2	17%
Maryland	407.0	107.0	6.0	7.7	10.8	20%
Maine	494.1	105.6	3.8	9.5	11.0	41%
Michigan	433.1	83.1	5.1	7.8	8.2	27%
Minnesota	427.7	93.7	4.8	9.1	8.3	15%
Missouri	423.8	89.1	7.1	6.8	8.9	32%
Mississippi	366.4	59.5	6.8	8.8	9.4	42%
Montana	428.9	80.3	4.8	6.3	8.0	35%
North Carolina	393.8	79.1	4.0	6.2	7.1	14%
North Dakota	441.5	123.7	5.7	8.7	12.1	16%
Nebraska	421.8	87.4	3.9	7.6	7.7	18%
New Hampshire	438.0	119.4	4.4	7.5	8.6	32%
New Jersey	401.5	147.1	2.6	9.3	10.3	15%
New Mexico	371.0	67.4	5.3	3.8	9.0	46%
Nevada	409.8	126.4	6.8	2.4	5.7	8%
New York	408.7	213.5	5.9	16.7	15.4	21%

Ohio	427.7	102.9	5.9	8.6	11.2	24%
Oklahoma	405.0	68.3	4.3	5.7	8.8	31%
Oregon	399.0	102.1	6.3	3.7	9.8	18%
Pennsylvania	420.1	89.4	2.2	9.5	8.3	23%
Rhode Island	434.3	170.6	8.7	21.1	13.7	49%
South Carolina	381.9	80.1	4.3	6.4	7.4	16%
South Dakota	409.4	84.2	6.1	7.3	10.7	26%
Tennessee	400.4	81.2	6.3	9.4	7.6	26%
Texas	370.4	98.9	5.0	3.7	7.5	14%
Utah	344.1	73.5	4.5	2.1	4.6	22%
Virginia	400.0	90.4	8.2	6.2	7.5	18%
Vermont	476.5	122.0	8.0	8.4	11.6	48%
Washington	399.1	110.7	7.6	4.1	8.7	14%
Wisconsin	444.6	118.4	4.4	7.2	6.6	13%
West Virginia	407.3	57.2	3.7	9.4	9.3	69%
Wyoming	396.6	74.9	5.6	5.1	5.7	65%
Total	400.2	111.6	5.3	7.1	9.2	18%

Table 2. 2009: Housing Units Per 1,000 Population across States

Next table shows the overall trend in the above reported statistics. We find that the overall housing units are increasing rapidly from 2004-2009, while the total supply of multi-family housing has stagnated, probably due to the housing boom, which makes investing in owner-occupied housing more attractive. LIHTC unit count in the same period has increased by 13.2%, while other non-LIHTC supply subsidy has dropped by 8.3%, and demand subsidy has no significant change. This clearly demonstrates the trend that the federal government is shifting its supply-side subsidy from the traditional public housing and direct subsidy into the tax credit system. The unit increase in LIHTC (0.6 unit per 1,000 people) roughly offsets the drop in non-LIHTC supply subsidy units (0.7 unit per 1,000 people).

Year	Total	Multi-Family	LIHTC	Non-LIHTC Supply Subsidy	Demand Subsidy
2004	393.7	110.8	4.7	7.8	9.1
2005	396.8	111.0	5.0	7.7	9.1
2006	399.4	111.2	5.2	7.4	9.1
2007	401.0	111.3	5.3	7.4	9.2
2009	400.2	111.6	5.3	7.1	9.2
Growth%	1.6%	0.7%	13.2%	-8.3%	0.7%

Table 3. 2004-2009: Housing Units Per 1,000 Population in United States

Regression Results

The following table shows the regression result for our reduced form model of total housing supply.

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	-366.043	143.3147	-2.55	0.0113
LIHTC units per 1,000 population	1	3.06981	0.70028	4.38	<.0001
Other Supply units per 1,000 population	1	0.24323	0.44965	0.54	0.589
Demand Subsidy units per 1,000 population	1	0.86978	0.64017	1.36	0.1755
Rental Vacancy Rate	1	1.56374	0.51354	3.05	0.0026
Population Density	1	0.00472	0.00217	2.18	0.0305
Percent of Asian population	1	-112.953	24.24736	-4.66	<.0001
Percent of Black population	1	-113.172	16.4756	-6.87	<.0001
Percent of Hispanic population	1	-96.4206	17.66982	-5.46	<.0001
Percent of 65+ years old population	1	501.3603	69.7352	7.19	<.0001
Log of Real Disposable Income	1	66.44007	13.82781	4.8	<.0001
Log of Median House Price	1	3.13266	5.47828	0.57	0.568
Poverty Rate	1	-0.94567	0.57956	-1.63	0.104
Total Population	1	-5.4E-06	0.000199	-0.03	0.9782
Root MSE	15.89475	R-Square	0.7146		
Dependent Mean	407.414	Adj R-Sq	0.6992		
Coeff Var	3.90138				

Table 4. Regression Results

After controlling for income and poverty measures, population, demographics, other supply and demand-side subsidies, construction cost (proxied by population density), and housing market condition (proxied by vacancy rate), we found LIHTC program has significant positive correlation with the overall housing supply. Also we achieved relatively good R-square with 255 observations of the panel data (51 states by 5 years).

In the next section, we are going to introduce a similar tax credit system in Australia, which has much shorter existence since its inception, and analyse whether we can offer some prospect into its future development.

National Rental Affordability Scheme (NRAS)

The National Rental Affordability Scheme (NRAS) was established in 2008 by the Australian Federal Government, working in partnership with states and territories, underpinned by the *National Rental Affordability Scheme Act 2008*, *the National Rental Affordability Scheme (Consequential Amendments) Act 2008*, and the *National Rental Affordability Scheme Regulations 2008* (FaHCSIA, 2011). By investing $1 billion in tax credits, the NRAS aims to stimulate the supply of new affordable rental dwellings, targeting 50,000 new affordable rental properties by June 2012 (Milligan, et al., 2009). Investors who are interested in the scheme must construct new "approved" dwelling, which must be rented to eligible low- and moderate- income households at rental prices no greater than 80 per cent of the market rates. The scheme is also anticipated to encourage large-scale investment and innovative delivery of affordable housing (FaHCSIA, 2011).

The incentives for private financing and ownership of new lower cost rental housing include two parts. One is through a Commonwealth contribution of a refundable tax offset valued at A$6,000 per dwelling (in 2008/09) indexed in accordance with the rental component of the Consumer Price Index for ten years, subject to annual compliance with the rules of the scheme (Gilmour and Milligan, 2008). In the case of non-for-profit organisations participating in the scheme that are registered charities with the Australian Tax Office (ATO), the Commonwealth contribution will be provided as an annual cash payment (FaHCSIA, 2011). The ATO-endorsed charitable institutions may elect to receive a refundable tax offset rather than a cash payment. The second incentive comes from state or territory government contribution in the form of a payment per dwelling per year for up to 10 years. The State and Territory Governments may provide in-kind support to the approved participants rather than a payment such as a discount on stamp duty, land taxes or infrastructure charges and discounted price of land. In addition, state and territory governments may provide their contributions to the National Rental Incentive for future years in advance, and contributions may not be deferred (FaHCSIA, 2011). For example, in 2008, NRAS funding is $6,000 from the Commonwealth and $2,000 from the NSW state government each year over a 10 year period (Elton Consulting, 2010).

The scheme emphasizes that the owners of the NRAS dwelling are to receive benefits of the tax incentives and grants guaranteed by the governments for 10 years. The mandatory conditions must be met in order for an approved participant to receive the incentive in respect to an approved rental dwelling (FaHCSIA, 2011). The mandatory conditions include dwellings will be rented to 'eligible tenants' and at a rate that is at least 20 per cent below the prevailing market rate, and so on. There is no obligation for the owner of the NRAS to remaining in the scheme, i.e., the owners can cease being an NRAS unit at any time during the 10 year period without penalty and merely foregoes the future benefits for the remaining balance of the 10 year term. The government takes no hold on title and has no legal or equitable claim over the property (McAuliffe, 2011).

In late 2010, the timeframe for the rollout of the 50,000 targeted dwellings was extended from 2012 to 2014. By June 2012, a total of 40,550 incentives have been allocated, reserved or under offer and 8,678 affordable rental dwellings were tenanted or available for rent.

The next table shows the current picture of Australia's housing supply in 2012. We found very similar characteristic with the US data. The total housing supply per 1,000 population is 388.9 units, which is close to the 400.2 units per 1,000 people in US. The minimum housing supply region is Northern Territory, with 325.7 units per 1,000 population. The maximum is South Australia with 429.3 units, and also the second highest number of public rental units of 25.3. Interestingly, the Australian Capital Territory also has the highest public rental units (28.9) and the highest NRAS count of 9.5 units per 1,000 people, very similar to District of Columbia in US. This phenomenon suggests that close physical distance to the federal government does have its benefit for getting approval for this type of housing subsidy.

State and Territory	Private Occupied Units	Public Rental Units	NRAS Delivery	NRAS Units	Total Units per 1,000	Public Rental per 1,000	NRAS Units per 1,000
Australia (Total)	8,555,000	333,400	2,378	10,671	388.9	14.6	1.2
New South Wales	2,750,100	115,700	228	1,505	391.2	15.8	0.5
Victoria	2,113,100	65,100	239	1,731	384.5	11.5	0.8
Queensland	1,719,600	51,700	1,275	3,436	384.7	11.2	2.0
South Australia	672,000	42,000	201	1,367	429.3	25.3	2.0
Western Australia	881,600	31,500	190	742	369.7	12.8	0.8
Tasmania	208,000	11,500	108	480	428.9	22.5	2.3
Northern Territory	72,400	5,100	91	105	325.7	21.4	1.5
Australian Capital Territory	137,900	10,900	46	1,305	393.9	28.9	9.5

Table 5. Housing Units in Australia States and Territories (2012)

The next table shows the trend of Australian housing supply since the inception of NRAS in 2008. Very similar to US, we found steady increase of housing units supply per 1,000 people. However, the public rental unit count per 1,000 people has shown drastic decrease of 1.2 units, or 7.8%. Coincidentally or not, this has been exactly offset by increase in NRAS units.

Year	Private Occupied Units	Public Rental Units	NRAS Delivery	NRAS Units	Total Units per 1,000	Public Rental per 1,000	NRAS Units per 1,000
2008	7,929,000	341,400	329	329	383.1	15.8	0.0
2009	8,082,000	339,800	1,418	1,747	384.1	15.5	0.2
2010	8,236,000	337,900	2,089	3,836	386.5	15.2	0.5
2011	8,395,000	336,500	4,457	8,293	388.3	15.0	1.0
2012	8,555,000	333,400	2,378	10,671	388.9	14.6	1.2
Growth	7.9%	-2.3%	622.8%	3143.5%	1.5%	-7.8%	2906.1%

Table 6. Housing Units in Australia (2008-2012)

Apparently, we found very similar trend in the housing supply of Australia and US. Public housing is on the downturn, which cannot keep up with the population growth, and have been

under criticism for clustered social problems concentrated in those projects. The tax credit system has largely compensated for the decline in other forms of supply-side housing subsidy. We are going to elaborate on the differences of LIHTC vs. NRAS in the next section.

LIHTC vs. NRAS

Both the NRAS and the LIHTC are primarily supply-side policies aimed to attract private sector investors to increase affordable rental housing units for low- and moderate-income families. There are a number of differences of the two policies although the NRAS program is built on a template provided by the LIHTC (Urban Research Center, 2008). First, the policies started with different economic backgrounds and conditions. In particular, the NRAS scheme was run only for four years, whereas the LIHTC was implemented for over 25 years. Second, the NRAS is funded by both the federal and state government whereas the LIHTC is funded by the federal government and administered at the state level. The LIHTC is set to provide for long-term affordable rental housing of 30 years, i.e., owners must keep the rental units available to low-income tenants for at least 30 years after completion of the project (EPA, 2011); whereas the NRAS aims for only 10 years currently. The scale of the LIHTC is thirty-six times of the NRAS. The two schemes are also differentiated by the main investment incentives. Under the LIHTC, corporate taxpayers can claim tax losses such as depreciation and interest on the rental building on their income tax returns (Such, 2002); whereas under the NRAS, there are no capital gains tax consequences from providing incentives or other benefits (ATO, 2012).

Backgrounds of introducing the policies
LIHTC was introduced when the US economy experienced a recession and a decade of stagflation, i.e., rising unemployment and inflation. There was mounting political pressure to stimulate the economy thus Reaganomics was introduced. Reaganomics is the economic policies promoted by then US president Ronald Reagan during the 1980s to reduce the growth of government spending, reduce income tax rate and capital gains tax rate, reduce government regulation of economy, and control money supply to reduce inflation (Niskanen, 1988). The Tax Reform Act of 1986 was passed on October 22, 1986 to replace the 1985 Tax Law, and the main provisions of the new tax law took effect on January 1, 1987. The new tax legislation resulted in sharply lower tax rates for both individuals (from 50 to 28 per cent) and corporations (from 46 to 34 per cent) (Jorgenson, 1990). The differences in the tax treatment of different types of assets were reduced substantially since the 10 per cent investment tax was removed and the 60 per cent exclusion of capital gains from taxable income at the individual level was also repealed (Jorgenson, 1990). The magnitude of the 1986 reductions in statutory tax at both individual and corporate levels is considered to be one of the main factors enhancing the LIHTC program success.

In Australia, house prices have increased dramatically since 1990s, at around 6% per annum appreciation (Stapledon, 2010). Since 2003, residential dwellings of all capital cities have roughly doubled in term of prices (ABS, 2012). High population growth (AAP, 2010), loosening credit standards (loan-to-value ratio reaches 95%), shortage of housing supply (News.com.au, 2010), and increasing foreign investment (Schwab, 2009) are all factors identified as attributes of the house price bubbles. The Australian tax system also favours investors and existing home owners though there "*is no conclusive evidence that the tax system has had a significant impact*

on house prices"(Costello, 2007). The favourable tax element includes negative gearing where 100 per cent tax deductible for costs of investment though 50 per cent capital gain is charged. As a result, Australian house prices were claimed as one of the highest in the world and overvalued about 25 per cent (IMF, 2008) and 56.1 per cent (The Economist, 2010). Many households have difficulty in meeting housing payments because of increased borrowings to meet the higher housing prices and stress from high rent.

The government introduced NRAS at a difficult economic time, when many investors were overexposed to the property asset class as a result of the decline in listed equity markets (Thornley, et al., 2011). The NRAS was created to *"increase the supply of affordable rental dwellings, reduce rental costs for low- and moderate-income households and encourage large-scale investment in and innovative delivery of affordable housing"* in 2008 (Australian Government, 2008). In response to the global financial crisis (GFC), interest rates were cut to the lowest recorded level and Australian Prime Minister Kevin Rudd and Treasurer Wayne Swan delivered stimulus packages include the first home buyer's grant that was doubled to $14,000 for existing homes and tripled to $21,000 for new homes. The Australian economy has recorded markedly better growth outcomes quite different to other parts of the world where they have experienced severe recessions and rises in unemployment. The banks were significantly affected by the GFC and suffered considerable losses. The U.S. banks lost about 60 per cent and British and Eurozone banks 40 per cent of their total asset values (IMF, 2009). The Australian banks did not suffer the similar fate. The Australian bank deposits were guaranteed by the Australian government and the banking system was much more resilient and the banks have now tightened up their credit and lending policies. As a result, it was relatively difficult for institution and individual investors to access debts from the banks. On the other hand, many institutional investors reduced their risk exposures by adjusting their balance sheet to lower the debt level to around 30 per cent. Combining the factors above, institutional and individual investors could be prevented entering into the NRAS scheme.

The NRAS was implemented 4 years ago and the LIHTC has been around for about 25 years. The NRAS has attracted 40,550 projects and provided 8,678 units of rental properties since the policy started to June 2012. However, the target of 50,000 properties produced in five years set by the federal government was too ambitious (Disney, 2011) and has not been met. For the first four years from 1986 to 1990, the LIHTC had 777 projects and provided 42,637 units. The LIHTC took more than five years to gather substantial momentum and has run successfully for more than two decade (Disney, 2011). The facts show that institutional investors were involved in the LIHTC as small numbers of projects produced a larger number of units (Table 2).

Funding Sources and Administration
The US federal government provides a fixed allocation of tax credit based on the population of each state. Every state receives an allocation of federal tax credits determined by formula, based on its population: $1.85 per capita, with a minimum allocation of $2,125,000 per state. The LIHTC program is administered at the state level by State Housing Finance Agencies who has wide discretion in determining which projects to award credits, and applications are considered under the state's "Qualified Allocation Plan" (QAP). The QAP includes the details of selection criteria for distribution of credits and dealing with issues such as project location (e.g., targeting inner-city areas and pockets of poverty), housing needs (e.g., low vacancy rate), project (e.g.,

whether the project increases the stock of low-income housing), sponsor characteristics and public housing waiting lists. The procedures to monitor compliance must also be set by the plan. Before issuing the credits, state agencies must consider the sources and use of property funds, the proceeds expected to be generated by the tax benefits, the cost of its operation, the percentage of the credit used for costs other than intermediary cost, and so on to ensure the economic viability of the property and a fair return to investors. In addition, at least 10 per cent of the state's credit ceiling is allocated to the non-profit organization. Failure to satisfy the minimum requirements specified in the QAP over the compliance period of either 15 or 30 years can result in credit recapture of previously taken credits with interest for all years prior to the violation and inability to claim credit from the project in the future. The tax credit program can be used either to construct new buildings or to rehabilitate existing buildings. All activities associated with the development of housing, including clean-up and demolition, can be claimed as expenses associated with the development of low-income housing for the purposes of claiming the tax credit. Both state agencies and private owners must report annually the utilizing the LIHTC. A criticism for the LIHTC administration is that there are major source of inconsistency and inefficiency as some fundamental flaws with regards to the LIHTC's administration, compliance and oversight.

Different from the LIHTC, the incentive of the NRAS scheme is provided by both Australian federal and state governments for 10 years. State and territory Governments must provide their contributions to the NRAS for future year in advance and not be deferred. The NRAS incentive can be used to construct new buildings only. It is income tax free, indexed to the rental component of the Consumer Price Index (CPI) and complemented by existing taxation arrangements including depreciation. The Secretary of the Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) is responsible for the management of NRAS, in consultation with the Australian Taxation Office (Australian Government, 2008). The assessment of applications is undertaken jointly between the Australian and State and Territory Government. Plibersek (2009) pointed out that the federal and state governments are both directly administering housing programs and having overlapping monitoring and regulatory processes. Milligan and Pinnegar (2010) indicated a concern that the State and Territory governments do not perform or if they disengage over time so that matching for all available incentives may be not secured. For example, the New South Wales state government announced that it will limit the number of incentives available to for-profit applicants to 1,250 dwellings, undermining the federal government's more ambitious targets (NSW government, 2012). There is a risk that the federal government abandons or withdraws from their administrative roles and leaves the states to manage it alone. Another criticism relates to the management of investment exit. There are no restrictions on the use of the dwellings produced after the expiration of the 10-year tax credit period (Lawson, et al, 2009). In addition, no regulations apply and dwellings may be sold after the tax incentive is offered for 10 years (Milligan and Pinnegar, 2010). This means that long-term supply of rental affordable housing cannot be guaranteed. Table 3 summarises the some of the differences of the both policies.

The metrics developed for evaluating the LIHTC may be inappropriate yardsticks to assess the effectiveness and efficiency in the NRAS contexts since the scheme has some difficulties in the early years. Lack of experiences to implement the new developed scheme might have been prevented by additional pre-implementation investor engagement and agency coordination. The

application process is in fact overly bureaucratic and burdensome, although NRAS was intended as a market-driven initiative (Thornley, et al., 2011). Both federal and state government act a role to manage and monitor the projects, the costs of compliance for the NRAS are expected higher. Moreover, Thornley et al. (2011) stated that the NRAS has "*failed to attract the interest of institutional investors in need of more aggregation, liquidity, and clear risk profiling. Investors were not sufficiently engaged at the outset of the policy to address these needs*."

Attractiveness of institutional investment

One of the NRAS's objectives is to attract and encourage large-scale investment (Australian Government, 2008). Desai, et al. (2011) suggested that a success program should not only make the program efficient and encourages competition, but attract a variety of market participants. In the discussion of whether the NRAS stimulates institutional investment in affordable housing, Gilmour and Milligan (2008) found that the NRAS relies on either private or non-for-profit investment partners who have limited access to supplementary funding. The main reasons of lack of institutional investors are not only low yield and high risks, but also illiquidity. The subsidy of $10,000 though indexed for each of the affordable rental units each year is notattractive enough to the institutional investors. The risk factors consist of a) the costs of keeping the properties at the rentable conditions; b) the potential subsidy and tax policies are changed; and c) and the risk of capital gain after ten years due to unpredictable market changes are the risk concerns for institutional investors. Insufficient details are released publicly on how the NRAS works is an additional issue.

In contrast to the LIHTC, the credits are intended to ensure an attractive minimum rate of return on investments in low-income housing (EPA, 2011), that is required rate of return is built into the bid price for credits. LIHTC tax-exempt bonds up to the federally allocated amount can be issued by the each state to attract investment capital for the development of low-income housing (EPA, 2011). The tax credit scheme has been consistent since introduced in 1986. The main source of development equity capital that is necessary to build or rehabilitate structures for low-income housing is raised by 'syndicating' the credit to an investor or a group of investors (EPA, 2011). A large number of experienced multi-disciplinary professionals specialised national tax credit legislation, regulations and syndicators have been established for over 25 years to provide the LIHTC application, negotiation and compliance support to the LIHTC participants. As a result, the LIHTC program has created over 2 million housing units since its inception using equity investments from public–private partnerships or financing and constructing approximately 100,000 rental units per year (Kaplan and Lambert, 2009). Desai, et al. (2011) provided that finance and insurance sector and holding company investors are the primarily participants who claimed credits of 65 per cent in 2000 and 89 per cent in 2006 of the total corporate credits. The evidences suggested the tax beneficiary is an important element in attracting the institutional investors to the LIHTC program.

Table 7 compares their differences in all the above mentioned aspects.

	LIHTC	NRAS
Starting year	1986	2008
Act	Tax Reform Act 1986	National Rental Affordability Scheme Act 2008
	Tax Credits, dollar-for-dollar	Incentives by subsidies
Scheme	9% and 4% tax credits	Federal $8000 +State $2000 in advance
	State government	Federal FaHCSIA +Taxation office
Adminstration	The Treasury	The Secretary
Incentive projects	Construct new or to rehabilitate existing buildings	Construct new buildings only
Developers' exit the policy	Credit recapture +interest	No penalty
Policy after the scheme	Yes	No
Requirement Factors		
Affordability requirements	30+ years	10 years
Targeting	Low-income	Low-moderate income
Main Investment incentives	Tax credits + depreciation	Tax credits + capital gain
Regulation	By contract	By contract
Transparency	Yes	No
Scale	1,800,000 dwellings	Target 50,000
Investment Factors		
Returns	Minimum rate of return on investments and the required return built into the bid price for credits	Low yield and no institutional investment market
Risks	Consistent tax credit system since introduced in 1986, relative lower management costs and depreciation tax and benefits	High risk due to the uncertainty about changes of policies, costs of properties management and capital appreciation
Costs	A rapid growth and larger scale of the LITHC market	High costs to keeping the invested properties since smaller scale of the NRAS market
Equity	Credits are syndicated are the main equity capital	No syndicated products available for the investment
Support	A large number of experienced consultants	Insufficient detail information

Table 7: The differences of the NRAS and the LIHTC schemes

Conclusion

Based on the panel data we collected on LIHTC program across 51 states and DC, our reduced form regression model shows strong positive effect of LIHTC on overall housing supply. Also the empirical data has shown that the supply of LIHTC units has greatly compensated the decline of other type of supply-side housing subsidy.

Due to the relative short history of NRAS, we did not run a similar regression for the NRAS data. However, the overall housing supply picture of Australia has shown very similar trend as the US, where overall housing supply are continuously increasing after adjustment for population growth, while traditional public rental housing units are declining, and the gap has been fully made up by newly constructed NRAS units.

Both the NRAS and the LIHTC programs play important roles in the supply of affordable rental housing for the low- and moderate-income households. The LIHTC program has created powerful investment incentive that attracts institutional investors to finance development of affordable rental housing through syndication. The NRAS scheme has also offered a strong incentive for small scale investors to increase affordable rental stocks. Stable economic conditions and long-term policies can ensure the NRAS scheme run successfully.

Some limitations do exist for both programs. In particular, it is notable that investors tend to go for less expensive projects which are normally located long distances away from the central business district. This will create a number of problems. The first problem is that the low- and moderate income households may have difficulties accessing employment opportunities; Secondly, the higher transportation costs could offset the lower rental costs subsidised by the governments; Third, social issues can be created when the low- and moderate-income families are all crowded together in suburbs far away from the CBD. Further studies are required to develop analytical matrix to study the effective and efficient of the NRAS scheme and implementations.

We look forward to collect more data on NARS as the program gain popularity and perform more robust statistical analysis.

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