The Habitat Minnesota Fund: The First Five Years

An Analysis of Affiliate Production and Program Participation

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Major Findings

After analyzing affiliates' housing production from 1998 through 2002 period, their demographic and geographic characteristics, their participation in the Habitat 2000 and 21st Century Fund programs (collectively, the Habitat Minnesota Fund), and several other characteristics regarding staffing and general organization, we find that affiliates should do two things in order to increase their construction capacity:

- **Affiliates should borrow all that they are eligible for under the lending programs. Participation has no negative consequences or opportunity costs. Participation in the programs has a dramatic impact on construction.**

- **Affiliates must hire staff at the level appropriate for their current construction activity.**

We also find that affiliate longevity helps to increase production:

- **The older an affiliate is, the more housing it produces. Moreover, housing production increases exponentially rather than linearly. That is, a ten-year-old affiliate can expect to produce *more than* twice as much as a five year old affiliate.**

Finally, we conclude that housing production is largely a matter of community will and proper organization. No affiliate has reached a production ceiling because of factors beyond its control. Production is *not* (or at least is not yet) limited by two of the factors we might suspect:

- **The wealth of a community, which accounts for both the population size and the total income of that population, does not affect production.**

- **The urbanization of a community does not affect production. Urban communities are *not* at any advantage relative to rural communities. In fact, rural affiliates have a very marginal (perhaps negligible) advantage in housing production, all things being equal.**

Affiliates in the Study

There are currently thirty-four affiliates building in the state of Minnesota. Of these, four cross into neighboring states, and have had the majority of their production in the neighboring states. The lending programs require that collateral mortgages be on homes in Minnesota, and that the loan monies are used for construction in the state of Minnesota. Of these four line-crossing affiliates, only one (Big Stone Lake) has participated in the Habitat Minnesota Fund, and this was at a very low level (one loan for $40,000). Because of their lack of participation and

because the program requirements make comparing them to other Minnesota affiliates difficult, they are dropped from the study.

The Twin Cities affiliate has also been dropped from the study. While it has been a major participant in the program, its sheer size makes it impossible to compare to any other affiliate in the state. When it is included in the analysis we are led to conclude, with near mathematical certainty, that the Twin Cities will produce more homes than the other affiliates. While it is certainly true, it is not very informative. Hence, we have omitted it from this analysis.

This leaves us with twenty-nine Minnesota affiliates to examine. These affiliates vary widely in their participation in the lending programs, as well as in other characteristics, such as staffing levels, affiliate age, community wealth, and housing production. From these twenty-nine we are led to the conclusions outlined above, and can see some interesting patterns emerge.

Data Collection and Variables Considered

This study examines HFH Affiliates' housing production in the state during the 1998 through 2002 period. The following table displays the variables examined, their operational definitions, and the source of the data:

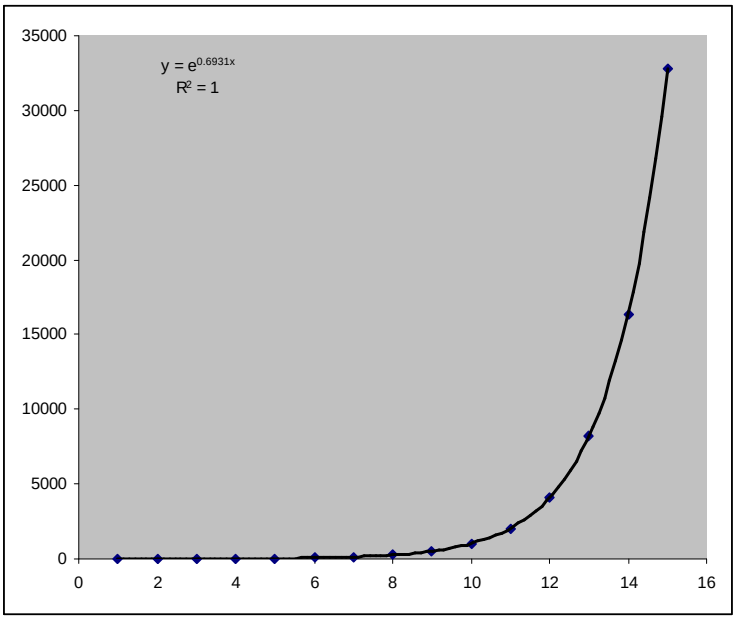
Symbol	Variable	Definition	Source
H	Houses	The total number of houses completed by an affiliate between 1998 and 2002	HFHI Midwest
Y	Years	The age of an affiliate in years as of Dec., 2002	HFHI Midwest
W	Wealth	The wealth of a community, defined as the per capita money income multiplied by the total population of the affiliate's service area	US Census Bureau
U	Urbanization	The population density of an affiliate's service area, defined as total population / sq. miles	US Census Bureau
V	VISTA	The total number of VISTA service years at an affiliate since 1999	HFHMN
S	Staff	The average number of FTEs at an affiliate during the study period	HFHI Midwest
P	Participation	Participation in the Habitat Minnesota Fund, defined as the total dollars borrowed	HFHMN

Bi-Variate Relationships

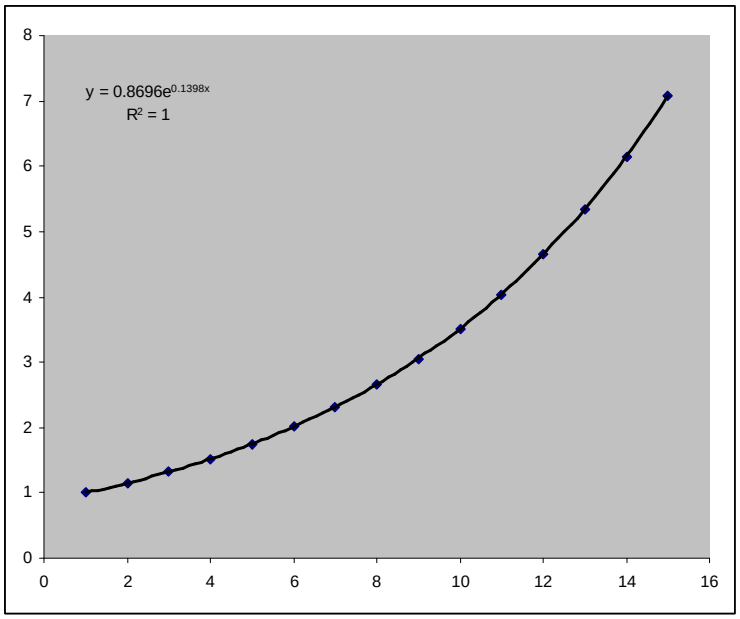
It is useful to examine the relationship between the number of houses built by an affiliate and each of the other variables. Scatterplots are a convenient mechanism for conveying the strength and nature of the relationship.

Houses and Affiliate Longevity

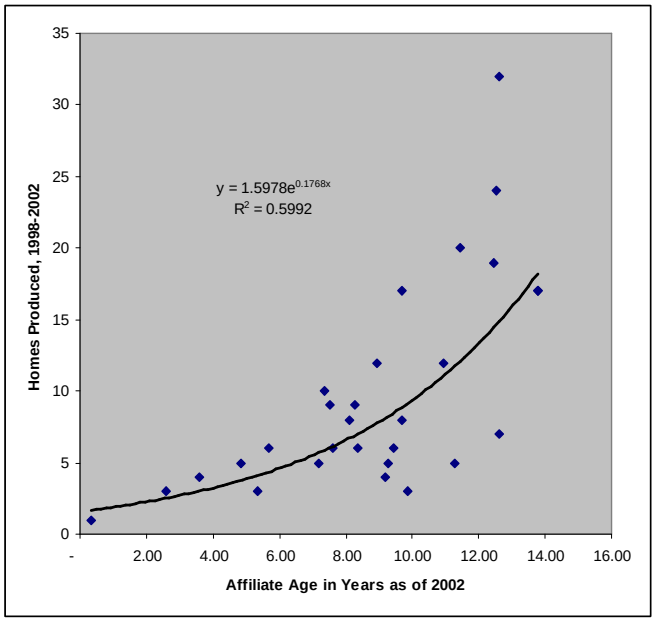
Habitat lore has it that housing production grows exponentially. That is, the longer you are in business, the more homes you will produce each year. Some have, rather foolishly, argued that an affiliate can double its production every year. If this is the case, the production curve will be the following:



More realistically, we can posit that it is possible that affiliates can grow at a rate of fifteen percent a year, which would result in the following curve:



In reality, we find a curve very similar to this one. The outstate Minnesota affiliates' five year production totals plot as



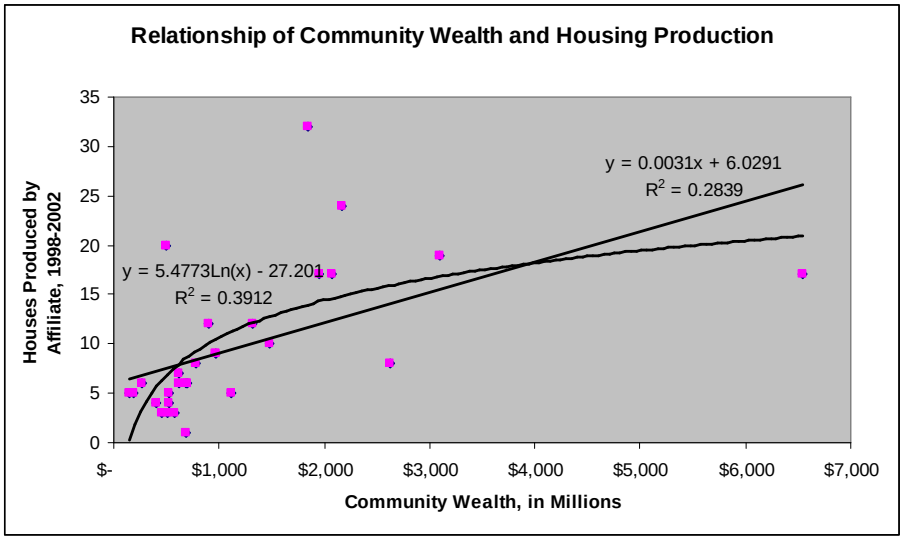
- **Affiliates are growing at about 15% annually, which is to say, they can double their production about every five years. This 15% growth level is a realistic goal for an affiliate to adopt.**

Community Wealth

It is only natural to expect that wealthy communities will build more homes than communities with few resources. Contrary to our intuition, we find that this is not the case. The following plot shows the bi-variate relationship between wealth and housing production.

The plot shows that neither the linear nor the logarithmic function of wealth is a particularly reliable predictor of production. Neither produces an R^2 statistic above .40, meaning that a great deal of the variance in the data is left unexplained.

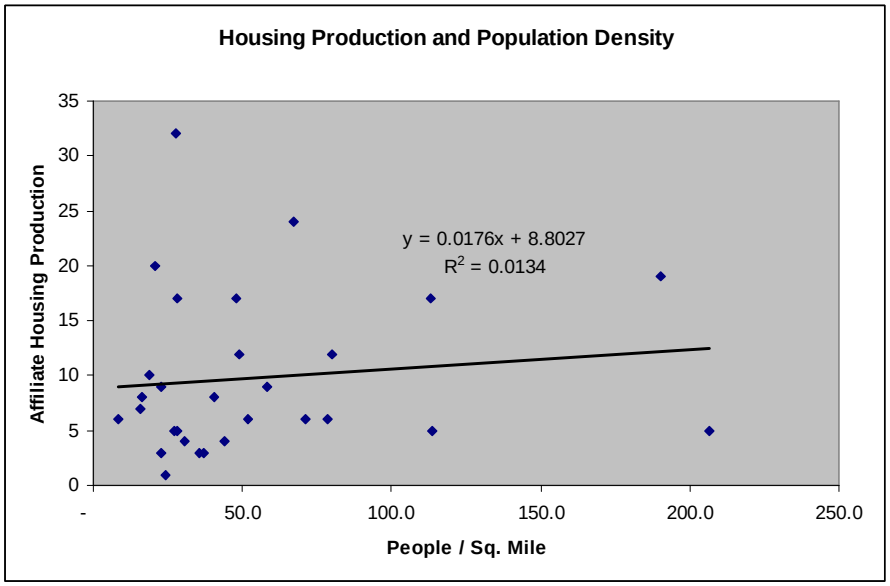
The reader should be cautioned that this plot is deceptive. Despite the weak relationship that it shows, it is still overstating it. The graph shows the relationship between wealth and production *in isolation from all of the other variables*. Once we have considered all of the import variables simultaneously, the relationship between wealth and production disappears.



- **The multi-variate model we show that there is no relationship to speak of between community wealth and affiliates' housing production. There is no affiliate with a service area so poor that it cannot participate, and participate well, in the ministry of Habitat. If the service area's wealth does place a limit on production, we have yet to find that limit.**

Urbanization

- **In neither the bi-variate nor the multivariate models do we see a significant effect from urbanization. (The multivariate model actually shows that production declines as population density increases, though not significantly). Rural affiliates are at no disadvantage.**



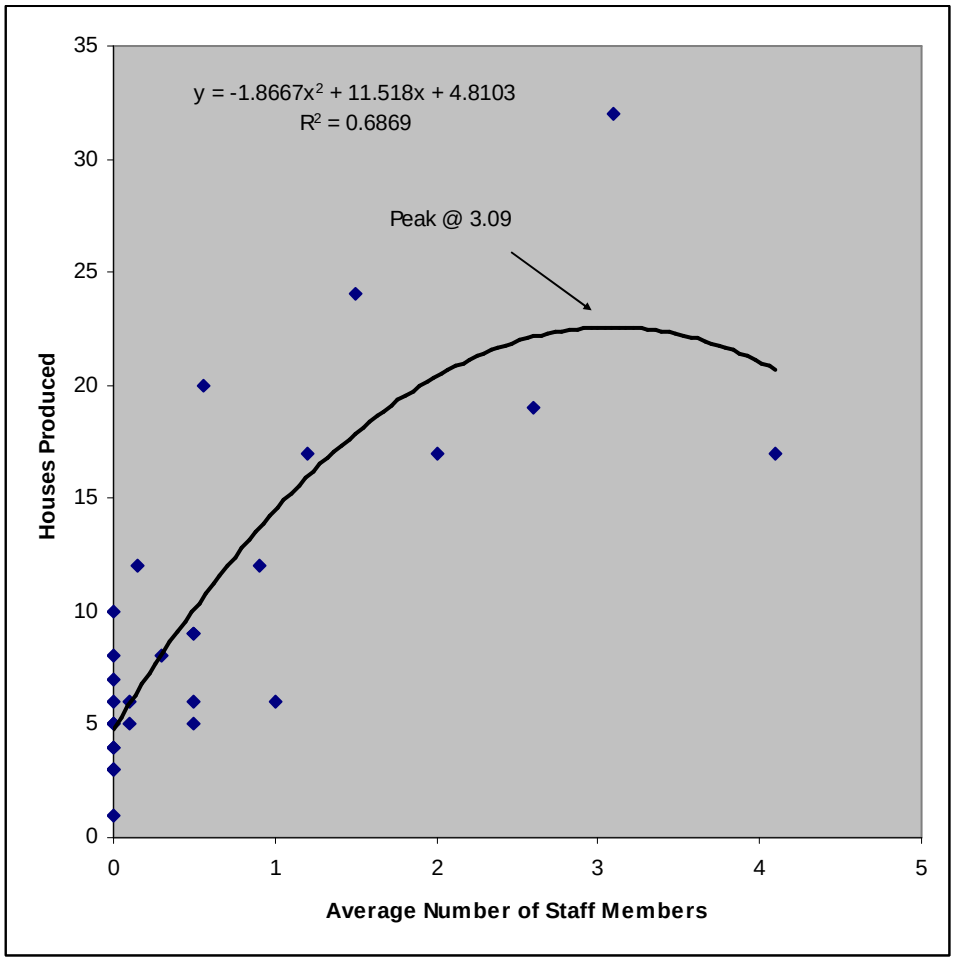
VISTA

These data do not show that participation in the VISTA program has a direct impact on the production levels of affiliates. However, this may not be surprising in that VISTAs do not perform direct service. To better understand the nature and scope of the effects of VISTA program we need to do more in-depth research. (My hunch is that VISTAs change the way that affiliates do business. While more production may not be the result, affiliates will function more smoothly and professionally as a result of VISTA service. The affect on production may be a very long-term, subtle phenomenon that we cannot capture in this short time span.)

Affiliate Staffing

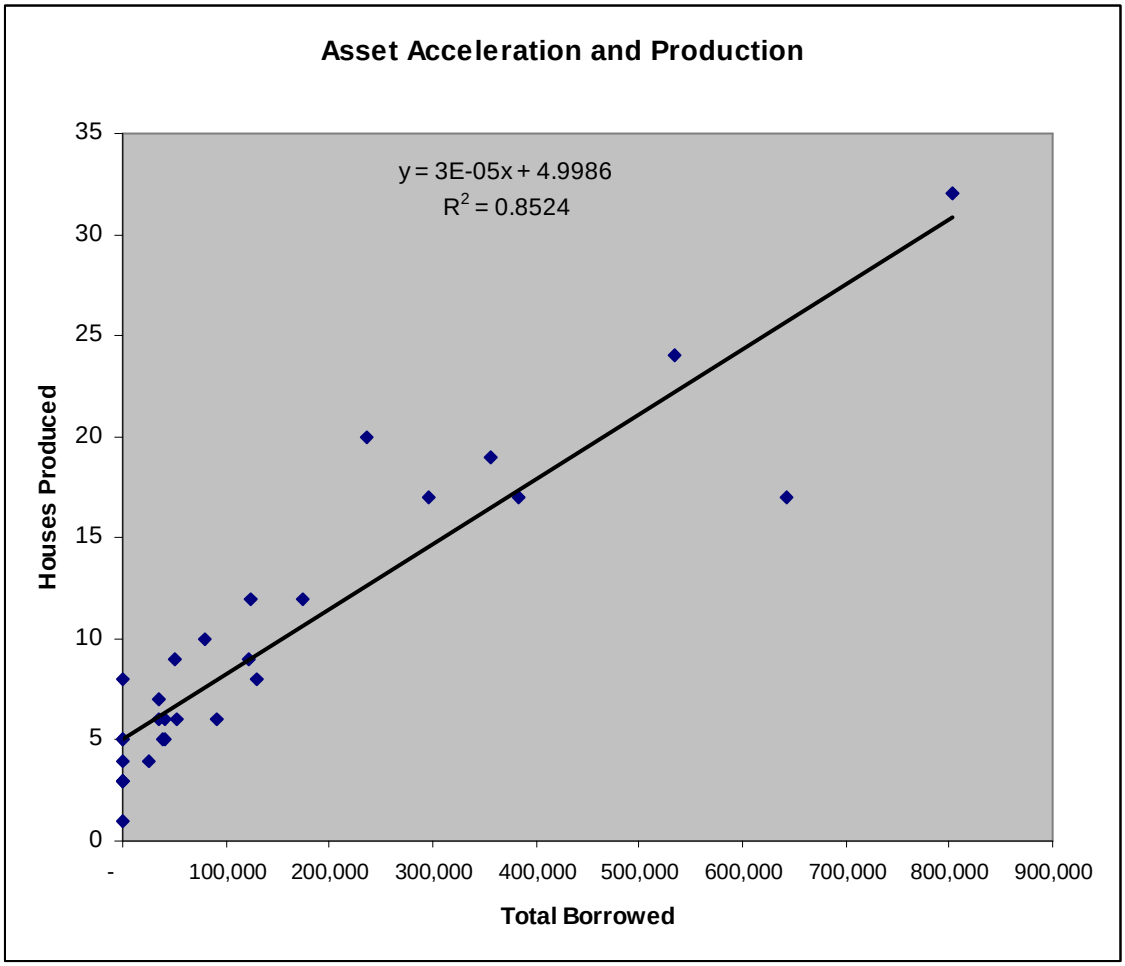
One of the most striking results of the study is that it is crucial for affiliates to staff appropriately.

- **Affiliates that are understaffed will reach a production ceiling of about two homes a year. Affiliates can also overstaff, allocating scarce resources to payroll that would be better spent on construction materials. The following curve demonstrates this clearly:**



Participation in Asset Acceleration Programs

Of course the point of this research is to determine the impact of HFHMN's asset acceleration programs. In a word, the effect is massive. Affiliates should borrow all that they can as soon as they can. There is neither a real cost nor an opportunity cost to participation, and the affiliates that are borrowing are building.



- **This bi-variate relationship shows that for every $10,000 an affiliate borrows, it is able to complete an additional 0.32 houses over a baseline of 5 houses for an affiliate that does not participate.**

This is not to say that affiliates are building houses for $30,000. The $10,000 is a measure of an affiliate's participation in the program, and participation requires local matching of funds. Hence, if an affiliate participates at the $10,000 level, it is generating $20,000 in total cash flow. Affiliates are building homes for about $60,000, so this relationship has good face validity.

The only caveat here is that affiliate staffing and borrowing from the fund are highly correlated with one another, but this is to be expected. The affiliates that are borrowing the most need staff to manage the growing program, and can afford staff because they have sufficient cash flow. (Because of this high correlation we must make some adjustments to the multivariate model, as shown below.)

- **To be most successful, affiliates must both accelerate their assets by pledging mortgages to the Habitat Minnesota Fund, and staff at the correct levels. Borrowing a great deal from the fund is not a cure all. If an affiliate is either understaffed or overstaffed, it will not perform at maximum efficiency.**

Technical Stuff and The Multi-Variate Model

The foregoing discussion examined the relationship of each variable to housing production, but did so in isolation from the other variables. It is best if we control for all variables simultaneously by creating a multi-variate OLS regression equation. (Don't worry, I'm not saying anything here that I haven't said in English above. If you want to skip this bit, you can.)

The complete model is specified as

$$z\text{-}H = \alpha + \beta_1 z\text{-}Y_t + \beta_2 z\text{-}W_t + \beta_3 z\text{-}U + \beta_4\, z\text{-}V^{½} + \beta_5\, ((z\text{-}S + z\text{-}P)/2) + \beta_6 S^2 + \varepsilon$$

where

- α is set to zero
- z denotes that variables have been standardized so that all resulting β coefficients will be in units of standard deviations
- Variables are as described in the table above
- The subscript t denotes a transformation of the data to account for non-linearity such that

  $Y_t = e^{.1768\, Y}$

  $W_t = \ln(W)$

- V has been raised to the ½ power to account for non-linearity
- Because of high correlation between S and P, and index was created, as shown in the equation.
- The S^2 term was included to model the opportunity costs of staffing. Past the peak of the curve, the more an affiliate spends on staff, the less it can produce.

Results

Regression Statistics	
Multiple R	0.9579
R Square	0.9176
Adj. R Square	0.8562
Standard Error	0.3224
Observations	29

	Coefficients	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
α	0	#N/A	#N/A	#N/A	#N/A
z-Y_t	0.2233	2.3906	**0.0254**	0.0301	0.4164
z-W_t	(0.0630)	(0.7421)	0.4656	(0.2387)	0.1127
z-U	(0.0982)	(1.5316)	*0.1393*	(0.2308)	0.0344
z-$V^{1/2}$	0.0289	0.3429	0.7348	(0.1457)	0.2035
(z-S+z-P)/2	1.6096	7.6523	**0.0000**	1.1745	2.0447
z-S^2	(0.9199)	(5.8866)	**0.0000**	(1.2432)	(0.5966)

- **The results indicate that an affiliate's longevity (which is of course beyond its control), and the combined effect of proper staffing and use of the asset acceleration program have driven production in outstate Minnesota over the last 5 years.**

- **The good news is that the Accelerated Asset Recovery program works very well, and if an affiliate wants to increase its production, it only needs to political and spiritual will to do so. The resources are in place.**

- **Affiliates need to think carefully and strategically about when, how, and who they hire.**

- **Continued technical support should be provided so that affiliates can maximize the efficiency of their internal operations.**