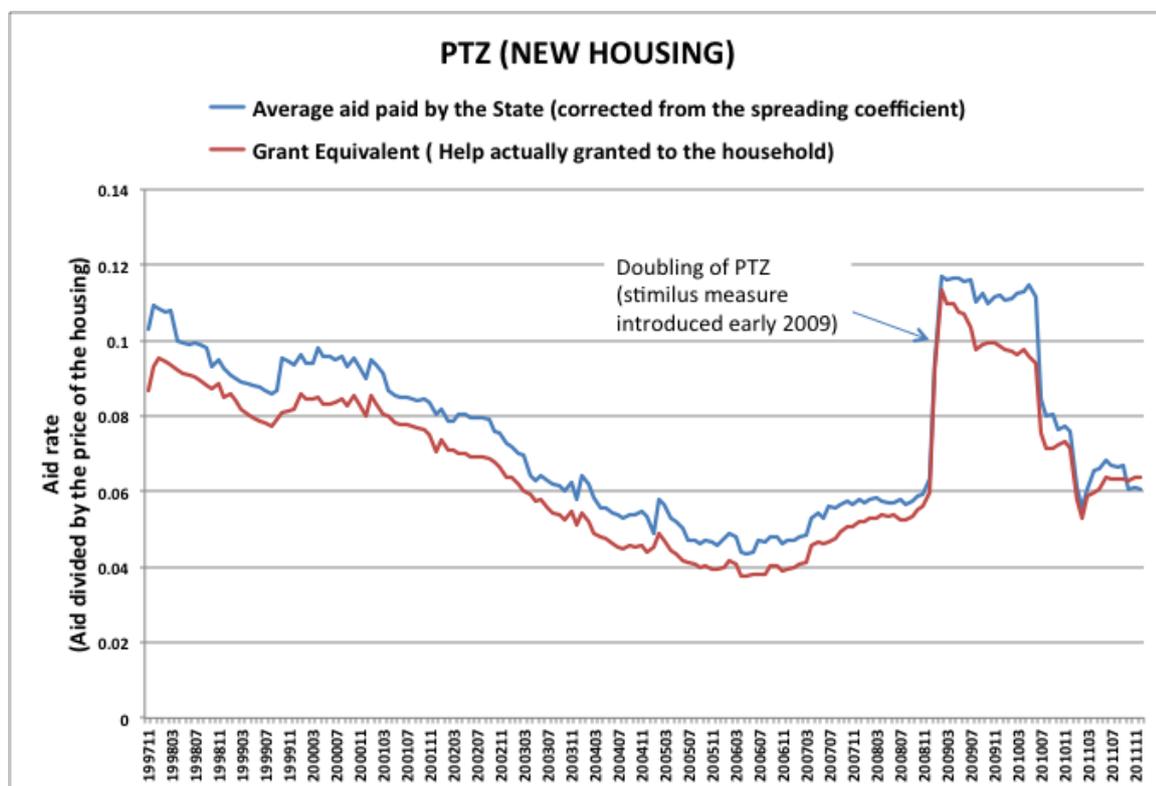


PTZ : Is the number of PTZ beneficiaries correlated to the amount of aid offered through it?

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The question of whether or not increasing or decreasing public aid via the interest-free loan system *prêt à taux zéro* (PTZ) used in France to help first-time home buyers who benefit from it is more than legitimate, especially in times of budgetary tightening.

The graph below shows the evolution of PTZ aidⁱⁱ in the new housing considering only the scope of operations of this study which is described below :



The variations are due to at the same time:

- To the changes in interest rates, the more the interest rates are high (or weak) the more the improvement is stronger (or lower)
- To the changes in housing prices (that decrease the rate of aid when they are growing, as it was the case in almost all the period under review)
- To the regulatory changes introduced by the government either to revive new housing construction via PTZ (early 2009 with the doubling of PTZ in the new housing) or to save money (end of the doubling in two stages)

As of January 1st, 2012, 2,880,000 loan (PTZ) records had been issued from affiliated credit institutions. This extensive database, which is available to SGFGAS, was used to determine if there is a correlation between the number of PTZ distributed and the amount of aid offered through it; if so, we attempted to measure the elasticity between these two variables despite the numerous regulatory changes that occurred since the introduction of PTZ in 1995. To obtain a homogenous database, all first-time-buyer deals that would not have been eligible in all periods were removed in order to measure only the effects of the change in aid and not its outright elimination.

We recall that an elasticity rate of 0.3 between the rate of public aid and the number of PTZ distributed means that a relative change in public support rate of 1% would result in a relative change of 0.3% in the number of PTZ distributed. Also note that correlation is not necessarily causation.

To highlight the investigated elasticities we used a log-log model (cf. [2]), and distinguished:

- two housing categories : new and old, (this method was used in the old housing sector with a minimum refurbishment ratio equal to at least 35% of the total transaction (including refurbishment) which has the added benefit of finding a more extensive record since this modality has existed since the introduction of PTZ) by selecting only transactions for which the household would be eligible, regardless of the period or periods under review (to remove the effects associated with resource capping changes and take into account the variations in intensity of aid).
- the four areasⁱⁱⁱ A, B1, B2 and C of the current mapping which are expected to account for more or less "tense" situation in the housing market
- household size in three classes (small, medium and large).

For all calculations concerning PTZ numbers, the analysis was conducted using monthly averages, separating the new from the old housing, which translates in 170 cases in the new housing category and 84 in the old category, representing the number of months observed in each case.

This study major conclusion is the well marked difference between new and old housing projects.

Results for accession in new housing

A small but significant elasticity between aid and number of PTZ distributed

The analysis of PTZ number variations relative to the amount of aid paid by the state (adjusted from an increase in collection spreading from banks for five years) as the only dependent variable allowed to highlight the new housing, positive and significant levels of elasticity in Area A for all family sizes, in Area B1 for "small" and "large" families, and in Area B2 for "average" and "large" families.

The introduction of the unemployment rate in the regression model only slightly changes the initial results, except in Area B1 where the unemployment rate alone is sufficient to explain changes in PTZ numbers at the expense of aid. Also note that "large" families in Area B2 remain relatively sensitive to the amount of aid.

Substituting the variable "aid from the state" by the variable "aid granted" to the household confirms this observation. However it results in a decrease of the elasticity levels previously observed. For example in Area A for "medium" sized families, there is a 0.315 elasticity between the rate of aid variation and that of PTZ numbers, whereas elasticity is of 0.280 if we replace aid paid by the State, the benefit to the household via the PTZ and other complementary assistances.

To explain this result, one can recall that part of the aid pays credit institutions (via a fixed margin fixed by decree) and that the "aid granted" is therefore a little lower than the "aid from state". Moreover, one can assume that an appropriate margin encourages banks to distribute more PTZ. Conversely, one might think that excessive reduction of the margin could undoubtedly have negative effects on PTZ number.

By removing additional aids to housing (apart from PTZ) we show that the elasticity of the residual variation aid (that is reduced to that of one PTZ) is much more important and significant, although

without notable improvements for "small household" in Area C. That could show a greater "efficiency" of aid granted by PTZ versus other grants.

Impact of aid on the size of the housing and the household effort rate

Several other approaches have been explored to look for a potential quality effect among households including upgrades in housing size or decreasing effort rate. For that purpose, the following were successively substituted from the logarithm of workforce as a dependent variable:

- the size of the housing
- the average area per room
- the household's gross effort rate corresponding to the ratio of the monthly smoothed loan payable by the borrower and his monthly income
- the net effort rate, taking into account housing monthly support ("*aide personnelle au logement (APL/AL)*") received by the household

Size of the housing and average area per room

The purpose of these two variables is to determine whether or not by increasing the amount of aid households would purchase their main residence of bigger surface area if it doesn't entice them to simply buy new residences. One can assume that any increase in aid results in an increase in housing surface area. However, the results show the opposite effect whether or not the unemployment rate is taken into consideration in the model.

A weak but significant linear relationship was observed between aid and housing surface area among all family and area categories. This result may seem surprising at first but can be explained by simultaneous developments of price and housing surface, especially in areas of strong demand such as Area A.

In fact, we noticed that during the period under study a downward trend in housing surfaces financed by a PTZ+, while at the same time prices have increased.

To complete this analysis, a linear regression was used to try and explain the changes in the size of housing financed by a PTZ + using the price alone and then using both the price and the total aid.

Two major findings emerged from this analysis:

- the regression performed on the price alone confirms the presence of a significant negative linear relationship with housing size
- the inclusion of total aid (by value) in the model as additional explanatory variable suggests on the one hand that the negative linear relationship between price and surface area is confirmed, and on the other hand that price, when significant, captures the largest proportion of explained variance in the model.

Here we can assume that state aid does allow households to consider more expensive deals but they do not necessarily seek more living space but better locations instead (areas with good employment prospects and positive school reviews, etc.).

Impact on the household effort rate

Effort rate was used as the dependent variable in this analysis to identify two types of relationships depending on whether or not to take into account the potential housing benefit received by the household.

Indeed in the case of gross effort ratio, we can see positive elasticities in certain areas, especially for "medium" and "large" families in almost all areas. This may be due to the effect of "familialization" (introduction of a kind of family quotient in the assessment of resources) of the scale on 1 January 2011.

Taking into account any personal housing aid received by households can improve these results in terms of economic interpretation, the higher the level of aid given to the household, the less his "net

[3]". effort rate is high. Aid granted under PTZ + (combination of rate aid and possible personal housing assistance-APL/AL) therefore has a positive impact on the level of effort sustained by households to acquire "real estate" for dwelling in that it lowers it, and is more pronounced as household size grows. In other words the higher the number of people in the household, the more important this effect.

Trigger effect

In order to assess a trigger effect, we tried to assess the minimal amount of aid likely to cause a variation in numbers of sales.

This attempt falls short of a true study of the trigger effect since the PTZ is limited to deals that use the PTZ without exception: for such a study one can refer to [Blanc et Gobillon \(2005\)](#)

This exercise, which involves building several parts of the database according to the deciles of logarithm values of aid, is made repeatedly by progressively restricting those parts. Starting from the two extreme deciles (D1 and D10) as a starting point, the lower deciles are eliminated until the median (D5). The aim is to help identify the threshold at which a trigger effect can be seen for a borrower. In this one PTZ aid was strictly used, where the distribution cutting in the new housing category allow to define the upper bounds for each decile.

Recall that throughout the sample there are significant and positive elasticities in all areas and all sizes of households except area C especially for "small" size families. Areas A ("small families"), B1 and B2 ("medium" and "large" families) contained higher elasticities. As showed in the following table:

Table 1- New housing : Elasticity rate between number of PTZ and **PTZ aid rate**

Households size	Small (1 et 2 p.)	Medium (3 et 4 p.)	Large (5 p. et +)
<i>Zone A</i>	0.56	0.48	0.61
<i>Zone B1</i>	0.22	0.44	0.62
<i>Zone B2</i>	0.21	0.59	0.85
<i>Zone C</i>	ns	0.27	0.29

Elimination of the lowest decile from the sample (PTZ support levels below 2.17%), improved this result and suggested positive, significant and stronger elasticities for all family and area categories. Furthermore, it even revealed elasticities in Area C for all household sizes.

The elimination of the consecutive deciles, starting directly from the third to the middle (the median), confirms the trend previously observed (second tab added).

Table 2- New housing: Elasticity rate between number of PTZ and **PTZ aid rate**, which is higher than its median (same as the Table 1 but without the 5 firsts deciles of the aid rate)

Households size	Small (1 et 2 p.)	Medium (3 et 4 p.)	Large (5 p. et +)
<i>Zone A</i>	3.65	4.64	3.00
<i>Zone B1</i>	4.09	2.60	1.09
<i>Zone B2</i>	4.35	2.49	1.38
<i>Zone C</i>	6.11	2.87	1.07

This result allows to highlight a more evident linear relationship between the number of PTZ and the amount of aid through it. Evidently, elimination of the relatively low rate of aid resulted in high levels of elasticity in all family and area categories.

In addition, small households from Area C had higher elasticity than Area A.

However, these findings do not suggest a real trigger effect on the purchase of a new home: it is rather a quantitative indication that below a certain level of aid (and probably also aid variation) there is very little elasticity, which means that in this case, the effect quality and / or deadweight predominate.. We could continue the analogy with mechanics by saying that there is a plastic phase instead of elasticity for low levels of aid (and probably aid variation).

Results in old housing

This analysis shows that, unlike in new housing, there is no significant elasticity between aid and the numbers of PTZ distributed.

This may be due to two effects:

- a much smaller period for data collection
- during this period first-time buyers experienced the same enthusiasm as second-time buyers for the purchase in the old housing, while aid rates were significantly lower than for new housing.

Nevertheless, we observed that in the new housing, small variations did not have any trigger effect due to inelastic behavior.

However, if we restrict the study to the purchases in old housing, with a minimum refurbishment ratio equal to at least 35% of the total transaction cost (including refurbishment), there was a significant elasticity except in Area A for large households.

In conclusion, in addition to the above mentioned key distinction between new and old housings, the most salient results of this study are the following:

- when elasticity is successfully measured, it is markedly stronger in the absence of complementary aids to PTZ. These are, in decreasing order of importance: interest deductibility on loans for the purchase of principal residence, local aid, etc. ;
- taking in account the whole aid (bank margin included) improves the model accuracy;
- despite the inability of measuring what is the real trigger threshold of PTZ as for the purchase of a new home, this study shows that below a minimum aid threshold there is very little or no elasticity (an initial phase of "plasticity").

For more details, download the whole study [elas.pdf \(in french\)](#)

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ⁱⁱ To measure it and eliminate the effect of prices, which have evolved significantly during the period under review, it has been divided by the prices.

ⁱⁱⁱ These areas have been initiated for the PTZ in 2005 (before, only the distinction between « Ile-de-France » and the country outback) correspond to a ranking of 36,000 towns considered as the seat of a tight rental market (one of the definitions is that in these towns there is a large gap between free housing rental prices and those from the subsidized sector); for more on the latest state of this zoning one can refer to the following site: <http://www.territoires.gouv.fr/un-nouveau-zonage-a-b-c-applicable-des-le-1er-octobre-2014-pour-certains-dispositifs> ; from 2005 aid rate significantly varies depending on the area as shown in the graph below in the case of a « small » size family.

