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Property Rights and Rural Development in China:

Trends in Land Allocation Under Conditions of Imperfect Property Markets

Abstract

The existing body of research on the development of property rights focuses largely on their evolution and expansion over time, framing the guarantee of private property as beneficial to economic and welfare outcomes. However, it is worth examining the characteristics of cases where we see the retrenchment of state power and backsliding of property rights, identifying the circumstances where this occurs and whether it can be an effective means of achieving a stable equilibrium under imperfect market conditions. In this paper, I examine agricultural property outcomes in rural China, determining the factor endowments that inform government land allocation policy trends. I will be outlining how land, capital, and labor inputs, potential yield as well as time invariant province and village level effects determine whether household property holdings increase or decrease over time. In doing so I intend to demonstrate how state intervention and property reallocation attempts to achieve a more efficient distribution of property under conditions of imperfect property rights, mitigating the limitations of the existing Chinese land market. This paper ultimately demonstrates how the Chinese system of land acquisition mimics the function of the market by attempting to allocate land resources based on productivity, albeit with several notable drawbacks.

Introduction

It is widely accepted that strong property rights institutions are one of the essential preconditions of economic development (North, 1990). While this is often taken to be a necessary condition for successful development, it is important to look at cases of imperfect property rights where greater state discretion, and restrictions to the security of some kinds of property are necessary to achieve a stable equilibrium and promote development. It is worth examining the characteristics associated with these cases, and what makes them the exception to this common principle in order to better understand the countervailing roles of private and state actors in long term economic performance.

Economies where informal property ownership is common and the strength of property rights varies at the local level, offer insight into the different factors that contribute to individual and collective decision making when it comes to the development of land resources in particular. Building off the concept of dead capital popularized by De Soto (2000), I am interested in identifying the instances where under limited property rights there is increased social utility from state intervention and reallocation of underleveraged property, relative to letting the property remain under informal ownership. To do so I will be looking at rural land use and ownership in China, tracking parcels of agricultural land over time and comparing the rates of transfer to and from a given household by local authorities based on observed and unobserved characteristics.

The two central questions of this paper are the following.

1. *What are the conditions where underleveraged capital is likely to be transferred from one owner to another?*
2. *When is this approach to development an effective substitute for the establishment of stronger property rights institutions in terms of long run economic development?*

Background

The premise that property that is not officially held by individuals is underleveraged or undervalued is partially true, but De Soto exaggerates its significance as an untapped resource that can be unlocked through granting private legal ownership. There are scenarios where even under conditions of more perfect property rights, the fixed costs for entrepreneurs to fully realize the value of their assets is too high for there to be any incentive to invest in a meaningful way. In cases where the investment is largely labor and expected return is high enough there is already an incentive to use bribes or informal networks to bypass bureaucratic barriers and accelerate the process of extended legal ownership, or expand property holdings. This process will filter out less profitable ventures and additionally allow for benefits from increasing returns to scale for those able to make capital investments. Many of the properties identified as dead capital suffer from the issue of fixed costs as a barrier to development and could be expected to remain as dead capital, even when the informal proprietor is granted legal ownership. Properties that require high capital investment are less likely to be developed by the current holder under the current system of distribution, even if we were to implement a system of more complete property rights, and thus we would see greater return from reallocation.

If there are limited private returns for the current property holder but potentially positive externalities that are of public interest, there is a stronger case to be made for state intervention and reallocation of the property, even if it undermines the expectation of secure property rights. Different households and firms have comparative advantage in the provision of some goods relative to others, namely those who have already made capital investments. Large scale investment in things like infrastructure, equipment and machinery are not cost effective for small scale operations, leaving the land underutilized by small scale tennants. This means that under

conditions of informal property distribution, determined by village and provincial authorities, transfer of ownership is ultimately necessary to maximize social utility due to the lack of property markets. With the role of the state being to correct market failures, under imperfect property rights where there is no stable equilibrium, the option that maximizes social utility might be to weaken property rights, expropriate the informal property holdings and transfer them to other more productive households.

The legal system of land distribution in rural China is organized largely at the local level with an acquisition process that has been the backbone of China's rapid urbanization and industrial development. Ding (2005) illustrates how the institutional structure of property rights and land acquisition in China was developed to increase productive gains and efficiently allocate land resources, overriding property rights institutions that are often deemed essential for successful development. This involved post-collectivization reforms giving immense discretion to local governments, allowing them to distribute, sell and acquire properties as well as reallocate tracts of land that are determined to be underutilized. This was a solution to the underdevelopment of Chinese land market institutions and was essentially a means of correcting the absence of secure property rights necessary for a functioning market system. This framework of land distribution policy is an effective case study in determining how officials at the local level decide to manage imperfect property rights, and correct failures resulting from imperfect property markets.

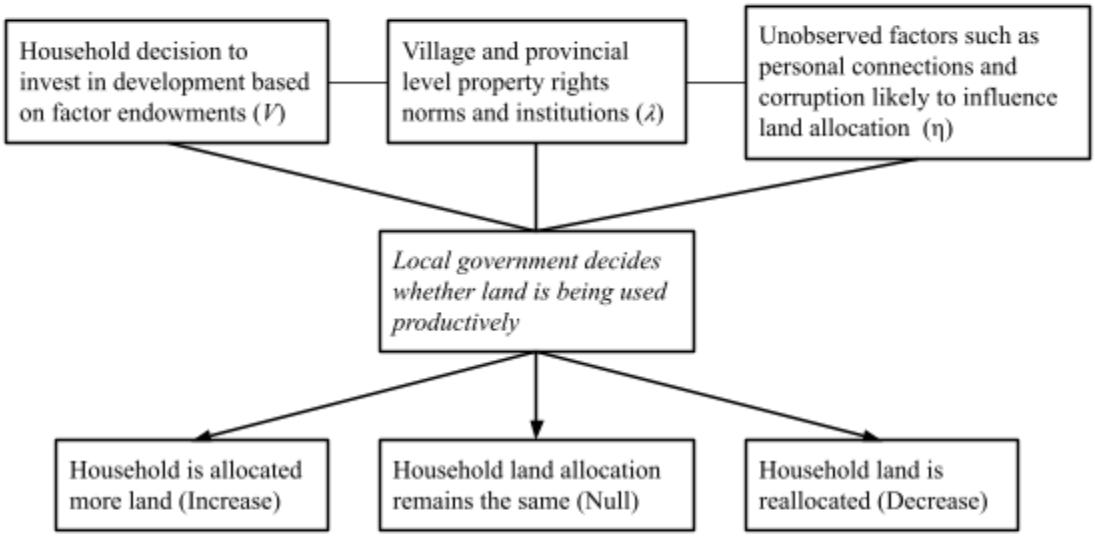
Data & Methodology

To answer my research questions I will be using panel data of land use in China from 1993 to 2002, provided by the Research Center for the Rural Economy and the Ministry of

Agriculture and Rural Affairs in China in addition to the household survey microdata calculations used by Adamopoulos et al. (2021) covering the same period. Within this data I will be identifying informally owned properties in the first survey period and observing their long term outcomes. The level of analysis is the plot of land held by a given household and there are three outcomes of interest; property holdings increase, property holdings decrease, and property holdings remain the same. The independent variables that I am interested in are the different costs associated with development, the strength of local property rights and the expected productivity of a plot of land, each of which ought to have a direct impact on the property outcomes of a given plot.

The observed outcomes are determined by decisions made by two actors, the informal property owner and the state, both of which we assume have complete information regarding the costs of development and the return for a given property. In order to understand what factors drive these different property outcomes, I have modeled the decisions of private and state actors when it comes to a plot of informally owned land. Beginning from a point of informal ownership, under imperfect property rights, a private actor has the option of investing and developing their property or not. This decision is based on the expected return from factor endowments of the allotted property. Thus we would expect that property that is too expensive for a household to develop will be reallocated to a different household with comparative advantages. This may take the form of greater capital investments, able to make more productive use of a given plot of land, thus resulting in the transfer of ownership.

FIGURE 1. Model of Property Outcomes



An individual household is able to choose whether to invest in their allotted property given the costs of development, strength of property rights and expected return on investment. If the property remains underutilized the state is then more to intervene and reallocate the property additionally taking into account the social utility of development and regional property rights norms.

In order to compare the occurrence of different outcomes I will be using a mixed logit model, based on a modified random utility framework (McFadden, 1973). This will model the probability of each alternative outcome; increase in land allocation or decrease in land allocation, for an individual household relative to the null (land allocation remains the same). A discrete model was employed rather than a continuous one because the decision to allocate land occurs in blocks as local officials determine whether a given household is effectively utilizing their land, with redistribution occurring as a result of this. Additionally, an unordered model was selected over an ordinal model because the three discrete outcomes are not meaningfully sequential and are better expressed as odds ratios relative to the null outcome.

Based on these constraints I will be modeling Utility U from plot n and outcome i in a given period t, based on property outcomes and observed variables. Utility is in this context

representative of the implied calculation made by local officials and is based on the assumption that the observed outcome is the social utility maximizing allocation of property resources according to said authorities. is representative of the coefficients that contribute to the variation in observed outcomes X_{in} dependent on property factor endowments V, village and province level fixed effects λ and unobserved variables η.

$$U_{int} = VX_{int} + \eta X_{int} + \lambda_{in} + \varepsilon_{int}$$

Contained in the observed variable term V are measures of the annual costs of developing a piece of property in terms of both capital and labor inputs respectively, the quality of the plot as represented by potential yield, the area of the plot of land, as well as the expectations that property rights will be enforced in a given village or province. The distribution of these observations can be seen below in Table 1.

$$V_{in} = \beta_0 Land\ Input_{in} + \beta_1 labor\ Input_{in} + \beta_2\ Capital\ Input_{in} + \beta_3\ Expected\ Yield_{in}$$

High labor input is expected to be positively related with continued ownership while high capital input is expected to be more positively related with reallocation to maximize productivity gains. The quality of land, and particularly its profitability should demonstrate the expected returns from development, with high return increasing likelihood that property will continue to be held by the same household and in some cases increased. Looking at the distribution of observed variables, it is clear that there are many small property holders and a few large ones. This can be seen across each input, where the maximum is several orders of magnitude greater than the mean or even upper quartile. This indicates that there is expected to be a relationship between the size of a household's property and the property outcomes, likely one where large landholders may continue growing at the expense of smaller tenants due to productivity gains from scale. However, most transfers appear to be relatively small.

Table 1: Indicator Summary Statistics

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Land Input	45,851	0.0435	0.0671	0.0003	0.0176	0.0437	3.3000
Change in Land Input	45,851	0.0010	0.0661	-4.6203	-0.0036	0.0040	2.8157
Labor Input	45,851	205.6461	148.1663	1.0000	100.0000	270.0000	2,150.0000
Capital Input	45,851	5.6817	36.4957	0.0007	0.2827	4.1157	5,379.1070
Potential Yield	45,851	1,463.0560	315.5909	0.0000	1,323.1550	1,660.0470	2,840.0070

The strength of property rights is observed at the local level and is significant for the state's decision to reallocate informally held land or conversely whether a private actor is incentivized to pursue development. This is represented by λ_{in} accounting for fixed effects at the village and province level, including the propensity for state intervention, consistent trends in reallocation as well as other time invariant characteristics that might affect the property outcomes. Weaker property rights institutions lower the threshold for reallocation, and raise the threshold for continued ownership. Conversely, strong perceptions of property rights institutions lowers the threshold for continued ownership, and raises the threshold for reallocation. It is likely that villages will systematically differ in the rates of property distribution based on the commitment to property rights by local officials.

Unobserved variables present in the utility model ($\eta X_{in} + \varepsilon_{in}$) are meant to capture the informal or unmeasured factors that systematically influence the decision making of either actor. For example, the ability to leverage personal networks is one factor that can increase the likelihood that a property is privatized. Bribes and extralegal means to circumvent the barriers of informal ownership are difficult to identify due to their informal nature but they do play a significant role in economies with imperfect property rights. Similarly corruption on the behalf of the local officials is also an important factor in state behavior and the decision whether to expropriate a piece of informally held property.

The utility model above can be used to determine the probability that a piece of land is increased or decreased compared to it remaining the same. The model below demonstrates the probability of outcome *i* versus *j* alternatives in choice set *C*. based on the decision model we will be observing the probability that informal property is increased (I) or decreased (D) as the odds ratio against the null where property remain the same ($\bar{I}$ & $\overline{D}$). This will demonstrate how each of the dependent variables of interest impact the probability that a plot will be reallocated or partially transferred across households.

$$P(i|C) = P[U_{in} \geq U_{jn}, \forall j \in C_n]$$

With this analysis I am hoping to determine how states and private actors jointly determine how to allocate resources, identifying the driving factors that contribute to private and state allocation of property. Through these observations, I will be expanding on my hypothesis that some economies may benefit or see greater returns from state intervention in the economy, even if it interferes with the expectation of secure property rights, with the transfer of underutilized land by state officials acting as a means to achieve pareto efficient allocation.

Results

In Table 2, we can see the outputs from the model above, demonstrating the trends in land outcomes based on the variables of interest. First, looking at land inputs it is clear that the greater the land holdings, the more likely it is that allocation will increase and conversely the less likely it is that property allocation will decrease. This indicates that it is primarily small farmers with limited property that are more likely to face property losses whereas the larger farmers are accumulating greater amounts of property. This is in line with the theory of returns to scale

where we can expect that larger operations are able to obtain a greater return than smaller or subsistence farms, making them less likely to be subject to reallocation. This additionally reinforces the prediction that this data will see relatively large landholders gaining more land while smaller and subsistence farmers will be losing property due to lower productivity.

Second, higher amounts of labor input are correlated with an elevated likelihood that property holdings will decrease and an insignificant effect on the likelihood of increase. This relationship is best illustrated in panel B of Figure 1, where we can see the probability that land holdings will decrease is positively related to labor inputs, while the likelihood of the null and increase decline. This means that land that demands high labor inputs is more likely to be transferred, all things held equal, contrary to the prediction that plots requiring high labor input are more likely to be productive and remain under the ownership of the current tenants. Looking at the odds ratio (see appendix), the likelihood of property decreasing rises by 0.2% for each additional unit of labor input. This could indicate that labor intensive development is the result of limited capital investment and thus these properties are more productive when transferred to households with larger land holdings and greater capital investments, but more evidence is unnecessary to corroborate this.

Table 2: Land Outcome Results

	Dependent variable:	
	Increase (1)	Decrease (2)
land	5.995^{***}	-18.024^{***}
	(0.002)	(0.002)
labour	0.0001	0.002^{***}
	(0.0001)	(0.0001)
capital	0.001^{*}	0.002^{*}
	(0.001)	(0.001)
poyield	-0.0005^{***}	-0.001^{***}
	(0.00002)	(0.00002)
Province Fixed Effects	Yes	Yes
Village Fixed Effects	Yes	Yes
Akaike Inf. Crit.	84,944.080	84,944.080
Note:	*p<0.1; **p<0.05; ***p<0.01	

Third, high rates of capital input are correlated with both increased and decreased property holdings relative to the null. This means that if a piece of property requires high rates of capital investment it is unlikely for it to remain the same and instead it will either be expanded or transferred. This is again likely to the gains made in efficiency due to the scale of the operation, where capital investment is more productive and cost effective for larger plots of land. Capital inputs however are only significant at the 0.9 level with an overall very small effect. The odds ratio puts both estimates at just over 0.1% increase in the likelihood of increase or decrease relative to the null for each additional unit of increase in capital input. Ultimately this means that property requiring high rates of capital investment is constantly being transferred and reallocated.

Finally we have potential yield. Based on the model, higher potential yield is significantly correlated with a reduced likelihood of transfers in general, where high quality land is less likely to be transferred to or from its present owner. This means that higher yield property is less likely to be reallocated in general, holding all other variables equal, making it the only one of the measured variables that has a higher relative probability of remaining constant. For each additional unit of potential yield from a given plot, the likelihood that the land is transferred is reduced by 0.01% to 0.005%. This relationship is illustrated in panel D of Figure 1, where it is clear that the probability of the null rises along with the yield, while the likelihood of decrease declines.

The fitted model is limited however, with the indicators of interest predicting the correct land outcome about 54.7% of the time relative to the null of 42.1% (See appendix). This means there are likely factors such as political influence, corruption and personal networks that have a significant and bearing on the allocation decisions of local officials, as indicated by term ηX_{in}.

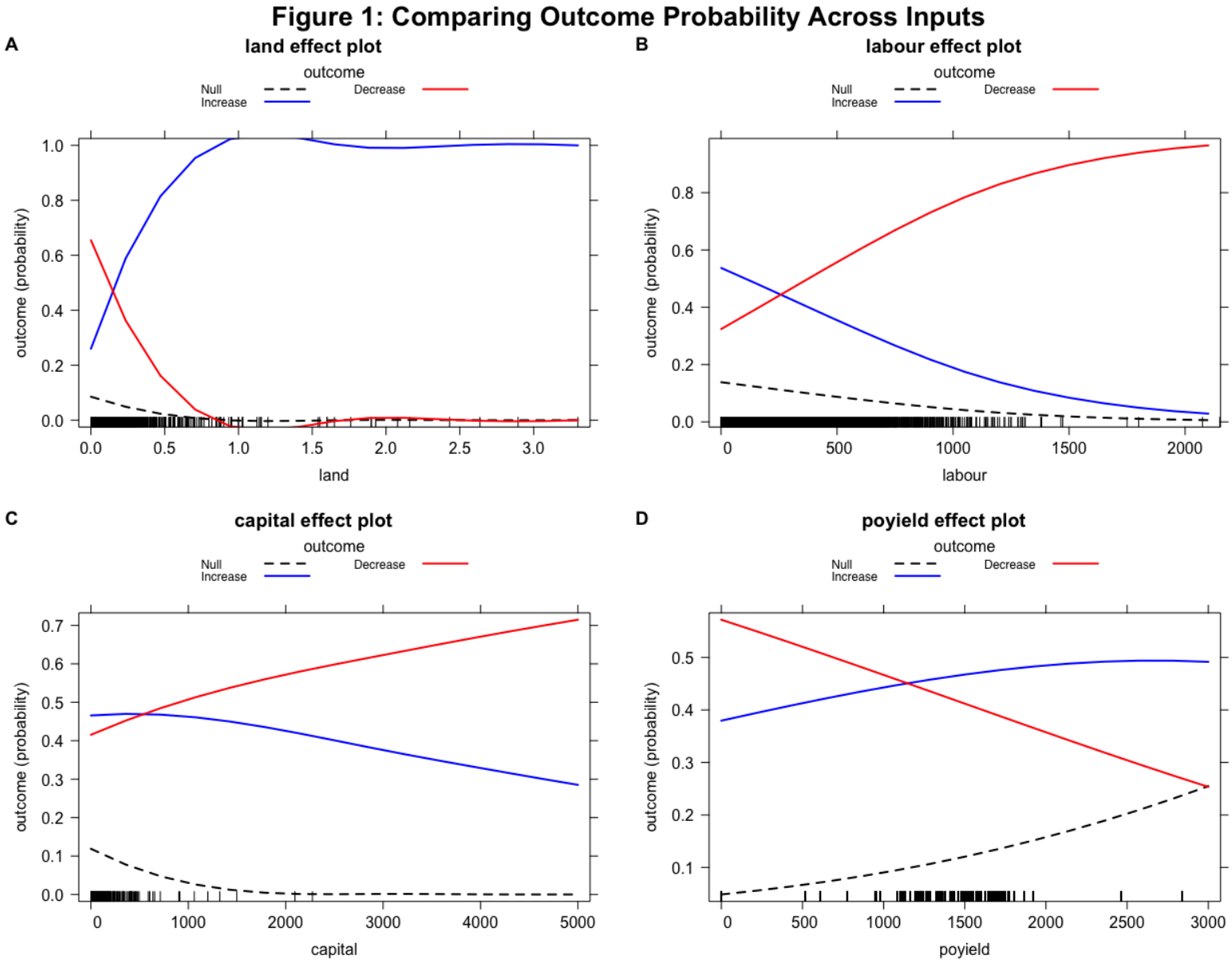


Figure 1: We see the trends described above clearly illustrated in each of the respective panels. As land holdings rise, so does the likelihood that they will continue to increase, high capital and labor inputs both result in a greater probability of decreased holdings, and finally, as potential yield rises, so does the likelihood of holdings remaining constant.

Conclusion

The village and provincial governments do function in a way that is meant to more efficiently allocate land resources, with those who have been allocated productive, high yield property being more likely to retain or expand upon their holdings, while those without the same initial factor endowments will see diminishing land holdings. In the absence of a functional land market, the redistributive discretion of local government is an important institution for spurring development and promoting gains in productivity, by rewarding higher yielding properties through the allocation of land resources. The most significant of the results is the impact of current land holdings on future outcomes. It is abundantly clear that in the data from 1993 to 2002 that there is a move from small household agriculture towards larger capital intensive farming, with large landholders being allocated greater portions of property. Capital input and potential yield had inverse effects as well, where more capital intensive property was very likely to be transferred while high yield land was more likely to remain the same.

In terms of the two main research questions, these results indicate that the state system of acquisition does seek to mimic the distributive function of the market. Property that is small, capital, or labor intensive are all relatively more likely to be reallocated to other households or firms. Local officials' decision to organize the allocation of property in the most productive way may not be as efficient as a functioning land market but it is a short term solution to the problem of imperfect property rights and the resulting land market failures, and is a major contributing factor to trends in rural-urban migration patterns.

Additional research ought to look at to whom the property is being allocated, and trends across sectors outside of agriculture. The data set used in this project is limited to the size of the land held by a given household and does not track the to and from whom transfers are taken and

received. This additional information would be helpful in elaborating on the causal relationship that exists between state intention and developmental outcomes, and shed light on how the Chinese system of land allocation effectively mitigates (or contributes to) market failures in land use. Finally, transformation of agricultural land to urban property or manufacturing establishments provide another interesting piece of the story of land allocation decision making.

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Appendix

Table 1: Odds Ratio for Outcomes Relative to the Null

	(Intercept)	land	labour	capital	poyield
Increase	4.046532	4.014837e+02	1.000090	1.001382	0.9995339
Decrease	11.475332	1.486743e-08	1.002004	1.001589	0.9991767

Table 2: Predicted vs Actual Outcomes based on Multinomial Model

Table of Actual (y) Against Predicted (p)
Classification rule: outcome with highest probability.

	p=Null	p=Increase	p=Decrease	Row PCP
y=Null	1806	2670	3000	24.16
y=Increase	1306	11126	6872	57.64
y=Decrease	1112	5805	12154	63.73

Percent Correctly Predicted, Fitted Model: 54.71%
Percent Correctly Predicted, Null Model : 42.1%