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Poverty and socio-financial inclusion in Japan

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Abstract

Poverty has always been a sensitive issue in Japan, in fact the first official statistics on this phenomenon have been released late in time compared to many developed countries. Similarly, the most important Japanese public assistance scheme is quite narrow, stigmatizing and discretionary, which suggests a cautious attitude towards poverty and the poor. In this regard, the scholars have pointed out some factors associated with poverty, such as income, employment, and education, but the association between financial characteristics of Japanese people and poverty is still under-researched. As financial inclusion has always been an important feature in Japan, and can be an important driver of poverty avoidance, the goal of this article is about inspecting the role of formal and informal financial instruments, including the ability to save, in reducing the likelihood of falling into poverty. Also, it analyzes the role of financial access in decreasing the deterioration of being well-off in Japan, using the World Bank dataset, and employing a logit regression analysis. The main findings of this article show that formal financial instruments, the savings capacity, and tertiary education are important drivers of reducing the probability of falling into poverty. Similarly, education, and financial instruments play a pivotal role in avoiding the movement from being well-off to becoming middle-class in Japan. Therefore, this article suggests that savings, the education system, and financial instruments are still a buffer against poverty in Japan. Further, it points out that probably public interventions which encourage financial inclusion should be strengthened.

1. Introduction

Income poverty is a debated and important issue in Japan, especially after the 1980s. The actual situation seems to show a not low level and steady poverty headcount level and an increasing poverty intensity. Research about this phenomenon in Japan has highlighted some important factors associated with income poverty, such as being woman, being young or old, the income level, the employment inclusion, and savings level to some extent. However, the literature about the drivers of income poverty in Japan does not thoroughly deal with the association of financial instruments with lower likelihood of falling into poverty. Therefore, my articles wants to fill this gap by analyzing the role of the ability to save, and of the formal and informal financial instruments, such as having a multi-purpose account, and a financial account, in reducing the probability of falling into poverty. This empirical analysis is interesting because financial inclusion can be important to obtain access to credit, and it is useful to establish a business, to finance an existing economic activity, to fund the education opportunities of children and adults. In fact, financial accounts, or multi-purpose accounts can have services that allow to get credit, and allows to use money from a financial institution to invest in a business. Similarly, the ability to save is pivotal to plan one's future, and one's family future, to have financial resources when unpredictable negative events hit an individual, also savings contribute to increasing the access to financial resources from banks. All these aspects can play an important role in avoiding falling into poverty, and in reducing the deterioration of your economic situation for individuals. In this sense, Japan has always been a nation which has tried to ease the individual or family credit access. Similarly, the Japanese governments have directly established public interventions in order to allow large firms, and to some extent to medium and small firms, to have access to financial credit. Further, Japan has introduced policies that allow people to have current accounts, such as the Postal deposit accounts, and which incentivize the ability to save. Hence, it is interesting to inspect whether this system, which has been encouraged by the Japanese governments, can play a role in avoiding falling into poverty, in avoiding economic situation deterioration. Moreover, this article includes demographic variables and the education system as factors that can explain poverty avoidance in Japan. The outcomes suggest that formal financial instruments, such as multi-purpose current accounts, and that the capacity to save play an important role not to fall into poverty, and to decrease the economic situation of individuals in Japan. Also, the results indicate that education is always a significant driver of reducing the probability to become poor and to experience a worsening of one's economic situation. Further, the findings probably suggests that the Japanese financial system and the government policies contribute to prevent poverty to some extent. Finally, this article pints out that financial inclusion interventions should be introduced and strenghtened in order to increase the role of financial instruments in avoiding poverty. Future analyses should use a longitudinal methodology in order to inspect whether some other financial means is important to avoid poverty. Moreover, an analysis about the role of financial instruments about poverty escape can be interesting and useful too both applying cross-section and in longitudinal mehtodologies to find out which financial opportunities are pivotal to reduce poverty.

2. Literature Review

As far the literature review is concerned, Sawada et al., (2011) point out that the credit crunch in 1997 generated a welfare loss which impinged on poverty of Japanese families. Moreover, Abe (2010) indicates that economic reasons influences leisure time activities deprivation. Similarly, the equivalent household income is associated with negative outcomes in most of the life dimensions. This article suggests that some segment of the sample not in the workforce is more prone to poverty in different dimensions due to financial issues. Finally, living standard at the age of 15 influences current basic need deprivations. Further, Shirahase and Raymo (2014) show that single mothers' poverty is associated with their personal low earnings profile. On the other hand, the financial support of coresidence among single mothers reduces income poverty. Moreover, a working paper by the Japanese NPO Center (2016) points out that people in financial exclusion are included in the set of individuals who are eligible for public assistance programs. Also, a book by Iwata and Nishizawa (2008) points out that poor and low-income individuals suffer from lack or reduction of savings. Moreover, Mizoguchi and Takayama (1984) point out that farmers' families in the lowest income decile have negative saving ratios. Similarly, nonagricultural households show higher percentage of having zero or less saving ratios. Also, an article by Kawano (2016) indicates that the opinion that poverty is poor's fault decreases with the increasing financial distress level of the working poor. On the other hand, Kume (2021) suggests that receiving salaries through bank transfers is associated with lower social exclusion. Similarly, the monthly salary payments are associated with lower social exclusion, whereas hand-delivered salary as well as weekly salary paymenets are associated with higher social exclusion. Further, Kawazoe (2008) indicates that savings can give help to reduce or smoothen other issues related to income poverty. Moreover, Kenji (2000), points out that some of the poor in Japan have no assets, including savings. Further, Masayoshi and Taira (1976) point out that in the Meiji period poor people could not afford to accrue any savings, and they incur in the issue of running into debt. On the other hand, the richer poor could save some income.

All the other articles that are about poverty determinants do not include financial deprivations as drivers of poverty. Specifically, Sujeong and Young (2015) indicate that one driver that decreases youth poverty in Japan is the financial situation of the parents, in which parents' income supports young individuals when individuals reside with their parents, as well as cohabitation. Both factors reduce Japanese youth costs and deliver them additional income. Also, Sekine (2008) suggests that income poverty is associated with unemployment in Japan. Similarly, poverty in Japan is associated with younger families, self-employment job, home piece-rate worker, with being unemployed, with living in Mimani-Kyushu area, with being younger, and being older person (Tachibanaki and Urakawa, 2008; Tachibanaki, 2006). Other factors are population aging, change in family structure, and the dual labour market. In addition, Saunders and Abe (2009) point out that poverty is associated with being lone parents, and single adults. Further, Raymo and Zhou (2012) indicate that subjective economic difficulties are negatively associated with education attainment, earnings, coresidence, and with being widowed, whereas it is positively associated with being a woman with two or more children. Also, Oshio et al. (2010) point out that child poverty is associated with adulthood risk of income poverty. Moreover, Abe (2006) suggests that young people are more at risk of being deprived, and living with sick and disabled increases the odds of being deprived. On the contrary, living with a spouse, and equalized family income are positively associated with decreasing deprivation. Moreover, Shirahase (2014) points out that families without children has higher poverty compared to families with children. Similarly, two-parent families with non-working mothers have higher poverty compared to two-parent families with working mothers. Younger and older people living alone face higher poverty incidence compared to younger, and older people living with parents too. Further, female one-person family has higher poverty headcount compared to male one-person, and couple-only households. Finally, families of old heads show bigger poverty incidence, as well as female old one-person families who are widowed. The literature about poverty

in Japan points indicates the main drivers of income poverty but there is a big gap about the association between formal and informal financial instruments and the reduction of the likelihood of falling in poverty. Similarly, this empirical analysis wants to fill the gap about the role of being able to save on lowering the probability of becoming poor, Finally, this paper wants to inspect the drivers that decrease the likelihood of moving from rich to middle class in Japan.

3. Dataset and Methodology

My article undertakes this empirical analysis by employing the World Bank microdataset on financial inclusion for Japan in the year 2011. Specifically, this is a survey dataset which contains 1000 observations and 41 variables, including weights, which account for oversamples and household size. The main variables employed in this article are gender, education attainment, financial-related variables, savings-related variables, age, and gross income quintiles (see table 10). All these variables are dichotomous dimensions, also I dichotomized the variable education achievement in 1 (having tertiary or higher education attainment) and 0 (having secondary education attainment or lower). Moreover, the variable monthly gross income by quintiles has been recodified in 0 for the three highest income quintiles, and 1 for the two lowest income quintiles (see table 10). This definition of poverty entails the situation of being rich and well-off, and being poor. Also, I use gross quintiles income poverty to identify the poor before the public support intervenes to ameliorate their situation. Two more variables regarding different definitions of poverty have been generated from the gross monthly income: the situation of being in richest two quintiles and the situation of being in poor quintiles, the variable that implies the situation of being in richest two quintiles and the situation of being in remaining three income quintiles. Finally, I constructed the dummy variable that indicates the situation of being in the richest two quintiles and the situation of being in the middle class income quintile, which is the third quintile (see table 10). The further poverty typologies have been set up to analyze the drivers that are associated with the probability of changing one's income situation. About the methodology of the empirical analysis, I employ a cross-section logit regression model, which aims to inspect the role of financial inclusion in avoiding income poverty. Specifically, the first analysis indicates the determinants of the probability of moving from the three highest income quintiles to the two bottom income quintiles. The second regression model indicates the dimensions that affect the probability of moving from the two richest income quintiles to the two remaining income quintiles. The third model shows the dimensions that affect the probability of moving from the two richest income quintiles to the three remaining income quintiles. Finally, the last model analyzes the main drivers that influence the probability of moving from the highest income quintiles to the third income quintile, as a proxy of the middle-class (see table 10). Specifically, the main equations are:

- 1) $\text{Income Poverty}_{2011} = \alpha + \beta X + \varepsilon_{2011}$
- 2) $\text{Rich to Poor}_{2011} = \alpha + \beta X_{2011} + \varepsilon_{2011}$
- 3) $\text{Mild Income Poverty}_{2011} = \alpha + \beta X_{2011} + \varepsilon_{2011}$
- 4) $\text{Rich to Middle}_{2011} = \alpha + \beta X_{2011} + \varepsilon_{2011}$

In which α is the intercept of the each regression model, and X include the independent variables, such as the financial, and savings-related dimensions, as well as the demographic and the education dimensions. The β coefficients indicate the sign and magnitude of between of the association between each independent variable and all the dependent variables. Finally, ε represents the error term of each regression model and the period of the regression analysis is

the year 2011. The next sections shows the correlations between the three dependent variables and the main independent variables. Afterwards, the results are shown and discussed.

4. Descriptive analysis

About the descriptive analysis, table 1 shows the association between the binary dependent variables, and the socio-financial dimensions, in order to inspect the relationship level of both set of variables, and to suggest which dimensions affect more individual poverty and the movement between income quintiles. Specifically, this table highlights the p-values of the Chi-Squared association test and of the correlation analysis between dependent and independent variables. The findings indicate that the attainment education level and the multiple purpose current accounts is associated with all the poverty definitions, and with the probability to move from higher income quintiles to middle-range income quintile. Similarly, having a credit card, receiving the salary in one's own current account, and the possibility to send money to one's own family are variables associated with all the poverty categories. On the other hand, having a financial current account is associated with extreme poverty, and mild income poverty too, with the likelihood of moving from higher to the middle-range income quintiles. Also, the using the electronic payment system to make payments, and having saved income are associated with the first two definitions of income poverty. Finally, borrowing money from private lenders is associated with the probability to moving from the richest quintiles to the middle-range income quintiles.

Table1: results about the association between the dependent variables and the independent variables

Variables	Income Poverty	Extreme Poverty	Income Poverty1	Rich to Middle
Education	0.00	0.00	0.00	0.02
Borrowing3	0.12*	0.31*	0.63*	0.03*
Gender	0.51	0.42	0.39	0.58
Financial Account	0.44	0.09	0.02	0.01
Postal Account	0.34	0.34	0.44	0.85
Multi-purpose Account	0.07	0.02	0.08	0.07
Debit Card	0.46	0.25	0.13	0.17
Credit Card	0.01	0.01	0.03	0.42
Checks	0.99	0.69	0.37	0.37*
Electronic Payment	0.01	0.07	0.15	0.82
Receiving Salary	0.00	0.00	0.04	0.35
Receiving from Family	0.19	0.22	0.36	0.95
Receiving_Transfers	0.8	0.76	0.32	0.11
Sending to Family	0.00	0.00	0.00	0.17
Savings	0.08	0.01	0.5	0.78
Saving to Expenses	0.81	0.96	0.82	0.62
Saving to Emergency	0.74	0.93	0.77	0.5
Financial Institution	0.24	0.21	0.28	0.69
Club	0.17	0.16	0.28	0.83
Borrowing4	0.33	0.31	0.39	0.78
Borrowing1	0.7	0.95	0.71	0.4
Borrowing2	0.48	0.45	0.5	0.78
Loan	0.33	0.38	0.57	0.9
Age**	-0.05	-0.07	-0.07	-0.06

* Fisher exact test p-values (variable associations)

**The values of the last row are about the correlation between the age of individuals and the dependent variables. The latter variables have been estimated using the polychor command, because the variable age is continuous whereas the dependent variables are binary.

5. Main outcomes

6. First model: moving from high income quintiles to poor quintiles

This model wants to analyze the drivers which are statistically associated with the likelihood to move from higher three income quintiles to bottom two income quintiles. The best logit model, using the AIC statistic is the following:

Table 2: Income Poverty regression outcome

Independent Variables	Coefficients	Standard Errors	Odds ratio	P-Value	Variance Inflation Factor
Intercept	0.549	0.581	1.733	0.09	
Education	-0.455	0.165	0.634	0.006**	1.044
Sending to Family	-0.669	0.216	0.511	0.001**	1.12
Age	-0.012	0.004	0.987	0.011*	1.126
Savings	-0.300	0.151	0.74	0.044*	1.095
Receiving Salary	-0.384	0.146	0.68	0.008**	1.096
Receiving Family	from 0.548	0.244	1.73	0.025*	1.108

significance 0 '***' 0,001 '**' 0,01 '*' 0,05 '.' 0,1 ' ' 1

Table 3: Regression analysis tests

	Values	P-value	Cook Distance
Akaike Statistics	1193.8		
Pseudo R-Squared (Mc Fadden)	0.075		
Outlier Test	2.211*	0.027	
Influence-Index Plot	2.211*		0.011**
Hosmer-Lemeshow specification test		0.95	

*largest studentized residual level

** this value is higher than the threshold level, which 0.0084

*** unadjusted p-value

As far as the diagnostic tests are concerned, the outlier test, the p-value Bonferroni graph, and the graphs of the residuals show neither extreme values nor issues in the residuals (see pictures 2, 3 and 4 in the appendix), hence the model seems to be well'specified. This outcome is confirmed by the goodness-of-fit-test using a proportional logit model and then employing the Hosmer-Lemeshow test. Further, the McFadden Pseudo-Rsq. indicates a not low model fit, which can suggest a good enough predictive power of the regression. This statistics is a ratio of the log-likelihood value of the estimated model to the log-likelihood value of the reference model (intercept model). If the predictive power of the chosen model has little significance, this ratio tends to the value of one and the McFadden Pseudo-Rsq. tends to zero (Mc Fadden formula: $1 - LL_{est} / LL_{null}$). Also, the fact that the value of the McFadden Pseudo-Rsq. is not so high does not mean that the

explanatory power of a phenomenon is not good, in fact, at the empirical level, if the value of this statistic is between 0.2 and 0.4, the model fit is considered very high. In this analysis the interpretation of the Pseudo-Rsq. value 0.075 as not low can be confirmed by the very big level of the p-value of the Hosmer-Lemeshow specification test. Finally, the multicollinearity test variables (the Variance Inflation Factors) does not indicate high magnitude correlation among the independent variables. About the leverage points/observations analysis, the Cook distance is used, this statistic measures the influence of a single observation on the estimation of the coefficients, and on the computation of the goodness-of-fit of the model. Specifically, the formula of the Cook distance $8/(n-2p)$, in which n symbolizes the sample size, p represents the number of the independent variables in the model, and it shows the threshold value above which the observations could become influential elements, and could generate a bias in the regression estimation and of the (goodness-of-fit) the overall fit of the regression model. In this model, the critical value of the Cook Distance is 0.0084, this might suggest that the observation 405 should be further analyzed, because it could bias the model results. Finally, the chosen model is significantly different from the intercept/reference model.

The logit findings show that the independent variable sending money to families from one's own current account is significant and increases the probability to avoid poverty compared not to sending money to families. Particularly, this outcome can signal the fact of having money enough to be able to send some income to one's own family. Moreover, being a university graduate is associated with bigger probability to escape poverty compared to having a lower education degree. This result shows the possibility to have well-paid job which allows to overcome income poverty situation. Similarly, the variable receiving salary in one's own current account indicates the same result. Finally, being able to save for future expenses in the last twelve months has positive association with poverty reduction. This outcome suggests good earning capability that allows to accrue savings enough too. Furthermore, age shows positive association with poverty diminution, because the older one becomes the bigger the economic stability is. On the other hand, receiving money from one's own family enhances the likelihood of becoming disadvantaged. This outcome may imply not having income enough to satisfy one's own needs, and the necessity to ask one's own family for money.

7. Second Model: moving from being rich to being poor

The second logit model analyzes which drivers affect the probability of moving from being rich to being in extreme income poverty, which means moving from the first two quintiles to the bottom two quintiles. The regression with the highest predictive power using the AIC statistic is the following:

Table 4: Rich to Poor regression outcome

Independent Variables	Coefficients	Standard Errors	Odds ratio	P-Value	Variance Inflation Factor
Intercept	0.657	0.339	1.929	0.052.	
Education	-0.563	0.176	0.569	0.001**	1.037
Sending to Family	-0.757	0.224	0.469	0.000***	1.097
Age	-0.009	0.005	0.99	0.062.	1.088
Savings	-0.309	0.164	0.733	0.059.	1.074
Receiving Family Multi-Purpose Account	from 0.539	0.266	1.715	0.042*	1.101
	-0.533	0.259	0.586	0.039*	1.009

significance 0 '***' 0,001 '**' 0,01 '*' 0,05 '.' 0,1 ' ' 1

Table 5: Regression analysis tests

	Values	P-value	Cook Distance
Akaike Statistics	992.4		
Pseudo R-Squared (Mc Fadden)	0.107		
Outlier Test	2.005*	0.044	
Hosmer-Lemeshow specification test		0.42	
Influence-Index Plot	2.005*		0.011**
	1.833*		0.01**
	1.88*		0.01**

*largest studentized residual level

** this value is higher than the threshold level, which is 0.0095

*** unadjusted p-value

The residuals graphs seem to suggest good model specification (see graph 7 in the appendix), this result is confirmed by the Hosmer-Lemeshow test (see the p-value of the specification test). Moreover, the McFadden Pseudo-Rsq. Indicates a higher fit compared to the previous regression model, which might mean a high enough predictive power of this regression. In addition, the outlier test, and the Bonferooni's p-value graph (see picture 8 in the appendix) suggest the lack of extreme values. Similarly, the multicollinearity test (the Variance Inflation Factor) does not show strong correlation among the independent variables. About the leverage observations, the threshold value of the Cook Distance is 0.0095, which implies that the observations 405, 433, and 477 could be influential, and able to bias the results, hence they should be carefully inspected. Finally, the chosen model is different from the intercept model. The outcomes show that sending money to one's own

family from one's own current account increases the likelihood of not falling into poverty, when one is in the two highest quintiles. Also, being university graduate is associated with lower probability to move from being rich to poverty. Similarly, using one's current account for both transational and business goals (multi-purpose aims) diminishes the likelihood of becoming poor. This finding can indicate the possibility to start one's own business, and to earn money enough to avoid poverty. Also, the ability to save in the last twelve months is a driver weakly associated with poverty avoidance. Finally, receiving money from family members enhances the probability to move from being in the two highest income quintiles to being poor. Comparing the results of the first two regressions, the findings show that mainly the same variables affect the likelihood not to fall into poverty. Specifically, as in the previous model, having university degree, and sending money to one's families are the most important drivers, although the association of these two variables with not being poor is bigger in the first regression model. However, having multipurpose account is significant only for the ability of rich people to prevent from entering income poverty. Hence, these two regressions suggest that the government action towards savings inclusion, and the socio-economic policies that increase financial and earning inclusion for the Japanese firms can be important to reduce the risk of falling into poverty. On the other hand, the richest segment of Japanese society can exploit the financial sector opportunities in order to protect itself from entering poverty.

8. Third Model: moving from high quintiles to mild income poverty

This model estimates the socio-financial dimensions that are associated with the probability of moving from the two highest income quintiles to the remaining lower income quintiles. In this sense, the poverty threhsold has been increased to include individuals with incomes which are in the middle of the distribution. The logit model with the best fit, using the AIC, is the following:

Table 6: Mild Income Poverty regression outcome

Independent Variables	Coefficients	Standard Errors	Odds ratio	P-Value	Variance Inflation Factor
Intercept	0.754	0.266	2.126	0.004**	
Education	-0.551	0.151	0.576	0.000***	1.037
Sending to Family	-0.585	0.184	0.556	0.001**	1.092
Age	-0.007	0.004	0.992	0.099.	1.04
Receiving from Family	0.412	0.239	1.511	0.084.	1.097
Multi-Purpose Account	-0.474	0.220	0.622	0.031*	1.012

significance 0 '***' 0,001 '**' 0,01 '*' 0,05 '.' 0,1 ' ' 1

Table 7: Regression analysis tests

	Values	P-value	Cook Distance
Akaike Statistics	1275.7		
Pseudo R-Squared (Mc Fadden)	0.086		
Outlier Test	1.7305*	0.083***	
Hosmer-Lemeshow specification test		0.67	
Influence-Index Plot	NA		

* Largest studentized residual level

** This value is higher than the threshold level, which 0.0086

*** unadjusted p-value

The Hosmer-Lemeshow test indicates that the model is not misspecified, also the McFadden pseudo-Rsq., although not high, could suggest a good enough predictive power. The outlier test together with the Bonferooni's p-value (see graph thirteen) signals the lack of extreme values. Similarly, the residuals plots suggest no issues about the residuals (see graph twelve). Further, the multicollinearity test does not highlight strong correlation among the independent variables. About the Cook Distance statistic, the threshold value is 0.0086, which shows no influential observations that can generate a bias in the estimations, and in the goodness-of-fit of the regression. Finally, the chosen model is significantly different from the intercept model.

About the model results indicate, sending money to one's own family enhances the likelihood to escape poverty. A similar outcome is shown for the variable being university graduate. Moreover, having multipurpose current account increases the probability to remain rich. Further, age has some association with decreasing falling into poverty. Finally, receiving money from one's own family has negative association with poverty escape. The outcome of this model is quite similar to the results of the previous one, although the ability to save is not significantly associated with avoiding mild and extreme income poverty. Probably, a definition of poverty that entails lower income vulnerability compared to the poverty definitions in the previous two regressions is not associated with the capacity to save in the last twelve months. On the other hand, it points out the importance of having a multipurpose current account to remain in the rich side of the society. This results may suggest the importance to own a business or to have a good level of income. In addition, university education achievement in the second and third regression model seems to be more associated with decreasing falling into poverty compared to the first regression outcomes. The reverse result is shown about sending money to one's own families. Therefore, education policy is important in each model but seems to play a relatively higher role for richer people to avoid falling into poverty. Also, the socio-economic system in Japan is more reachable and is important for rich people to avoid poverty. Finally, the socio-economic programs that help Japanese firms still affect the probability of avoiding poverty, by allowing to accrue income stability, although it seems to play bigger role in the first regression model.

About the Cook Distance of the first two regression models, considering this model as benchmark, the results show that the variables of the first two regressions have the same sign, similar p-value as well as coefficients compared to the third model. This result may indicate that the potential influential observations do not generate a significant bias in the regression estimation analysis.

9. Fourth Model: moving from high income quintiles to middle class

This model estimates the socio-financial drivers which have statistical impact on the probability to move from being rich to being in the third income quintile, which can be used as a proxy of middle class. The results of the regressions, using the AIC statistic, are the following:

Table 8: Rich to Middle regression outcome

Independent Variables	Coefficients	Standard Errors	Odds ratio	P-Value	Variance Inflation Factor
Intercept	0.267	0.475	1.306	0.573	
Education	-0.369	0.195	0.672	0.042*	1.004
Financial Account	-1.084	0.484	0.338	0.025*	1.004

significance 0 '***' 0,001 '**' 0,01 '*' 0,05 '.' 0,1 ' ' 1

Table 9: Regression analysis tests

	Values	P-value	Cook Distance
Akaike Statistics	785.66		
Pseudo R-Squared (Mc Fadden)	0.0259		
Outlier Test	1.7213*	0.085***	
Hosmer-Lemeshow specification test		0.106	
Influence-Index Plot	1.086		0.015**
	-1.322		0.027**
	1.263		0.027**
	1.263		0.027**

* Largest studentized residual level

** This value is higher than the threshold level, which 0.012

*** unadjusted p-value

The diagnostic test of this model suggest that the Hosmer-Lemeshow the misspecification of the model, and the McFadden Pseudo-Rsq is very low, suggesting a low predictive power of the model. Moreover, the outlier test, and the Bonferroni p-value (see graph 18) so not show potential extreme values, finally the VIF multicollinearity test does not indicate high correlation issues among independent variables. About the leverage observations analysis, the threshold value of the Cook test (0.0123) highlights that the observations 39, 89, 616, 770 could have influential levels which can bias the regression outcomes. Finally, the chosen model is significantly different from to the constrained model (the intercept model).

The regression outcome points out that having a financial current account is associated with higher probability of being included in the two richest quintiles of income. Further, tertiary education degree increases the probability to enhance one's incomes towards the wealthiest part of the society compared to have a secondary education degree. The comparison of this model with the previous ones suggests that this model shows lower AIC test and includes only one independent variable which is common with the previous regressions, that is the education level. Further, the other variables which are important in the previous models are not associated with reducing the likelihood to move from the richest quintiles to the third income quintile. Finally, tertiary education has lower association compared to the coefficient of this variable in the previous models. On the contrary, opening a financial current account is very important to avoid moving towards middle income quintiles, which is a factor not related to escaping poverty but is related to remaining rich. Specifically, this feature has the highest coefficient level and signals the role of being included in

the Japanese financial system to stay in the wealth segment of the society.

10. Conclusions

Financial inclusion is deemed to be important to escape poverty and to avoid it, in this sense this article wants to fill the gap in the literature about the importance of financial-related dimensions in Japan to avoid being in gross income poverty. Hence, this article wants to analyze how financial empowerment increases the likelihood to enhance the earning capability, that is the ability to earn income autonomously, and to avoid poverty permanently. Particularly, the main outcome of this piece of research is that the ability to receive the salary in one's current account, and ability to save is crucial capability to avoid falling into poverty. Moreover, the latter variable is important to avoid moving from the highest income quintiles to the two lowest income quintiles. Similarly, the ability to send money to one's family is associated with reducing the likelihood to enter poverty in almost every model except for the last one. In addition, having a multiscope account is important to prevent individuals from moving from the richest income level to poverty. Similarly, the ability to send money to one's family and having multipurpose account are associated with decreasing the probability to move from richest income quintiles to income poverty, in which the definition of poverty is widened to include the middle income quintile. Furthermore, opening a financial account reduces the probability of moving from rich quintiles to middle income quintiles. This outcome suggests that staying wealthy compared to be well-off is influenced by good financial inclusion in the Japanese economic system, and that this dimension is not significant to avoid poverty. Also, in Japan the education level affects preventing from falling into poverty and from moving to middle income quintiles, so it has a role in all the regression outcomes. This result indicates that education inclusion in Japan has good association with earning ability in high income level too. Similarly, increasing age has positive influence on preventing income poverty, although this variable is not significant to avoid falling into middle income quintile. The latter finding may show that the Japanese system tends to protect older individuals through fringe benefits, careers prospect, pension schemes, through the possibility to work in old age, and through the seniority wages, especially in large firms. Although, this system has been weakened, such as the replacement of seniority wages with performance-based wages, and the lower career opportunities, it still provides some buffer against poverty. Moreover, receiving money from one's family is an indicator of increasing likelihood to fall in poverty. Overall, the role of Japanese public policy system in accruing savings, in opening accounts, also in helping the firms in retaining workers and in increase credit market inclusion is still very important to avoid poverty and economic deterioration. Therefore, the postal system, the possibility to afford life insurance are instruments to saving generation and stabilization. Further, the rationalization cartels still provides profits stabilization, and the reduction of bankruptcy of firms, which can help avoiding falling into poverty as well. Similarly, the tertiary education system, and the education-employment policy are probably important drivers of employment inclusion and poverty prevention too. Finally, the private financial and economic system in Japan seem to allow the wealthiest part of the society to reduce the likelihood of becoming poor. This system allows the richest people to diminish the probability of moving towards middle class income level. Therefore, the public support and the financial system in Japan still play an important role as a buffer against income poverty, and against economic situation deterioration. However, it would be advisable to introduce policies that allow to open financial current accounts, and to increase the access to multi-purpose use of accounts to middle-class and poor people too, in order to strengthen the buffer against falling into poverty and to enhance the odds to escape from poverty.

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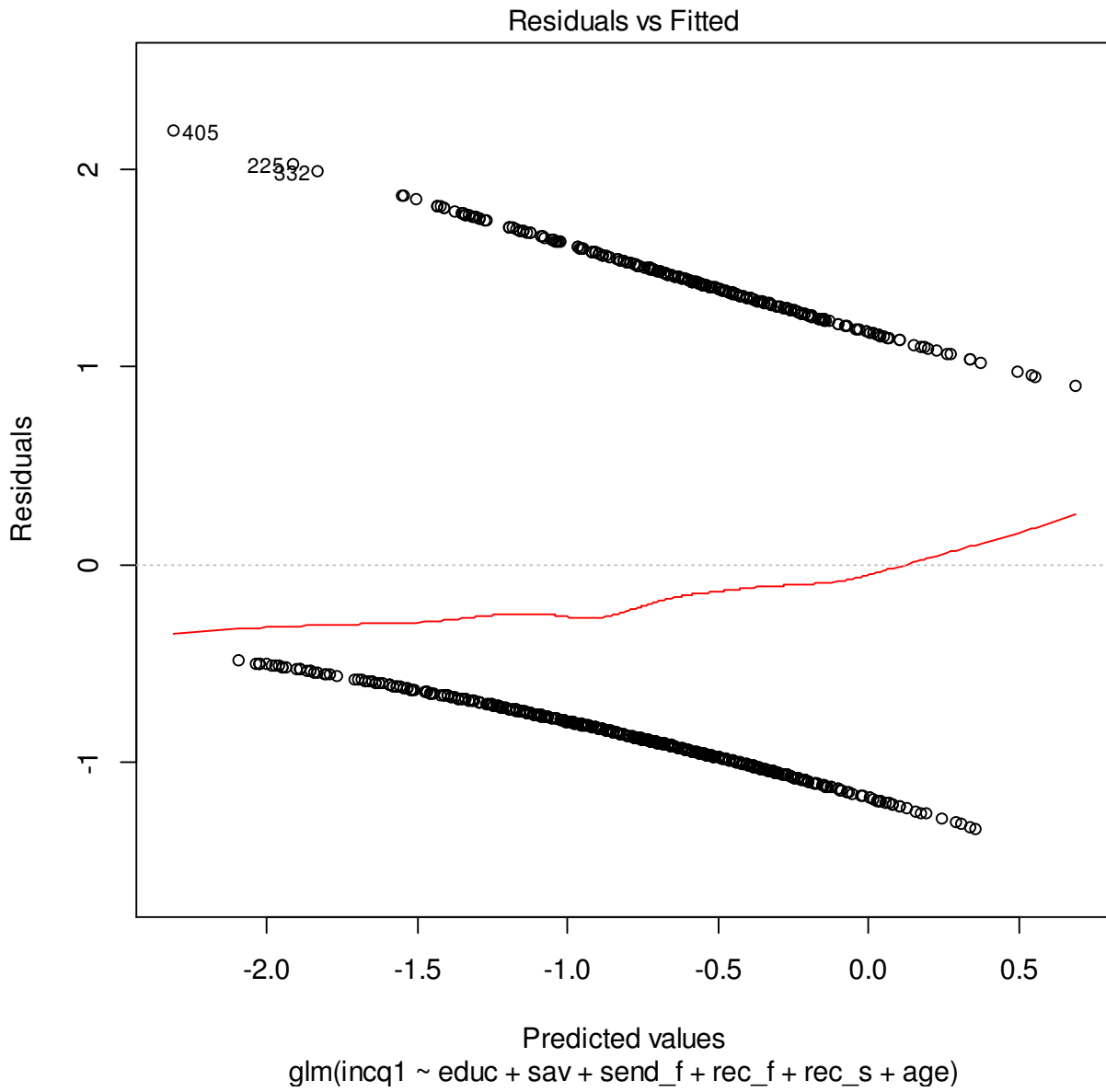
APPENDIX

Table 10: Code and description of the variables

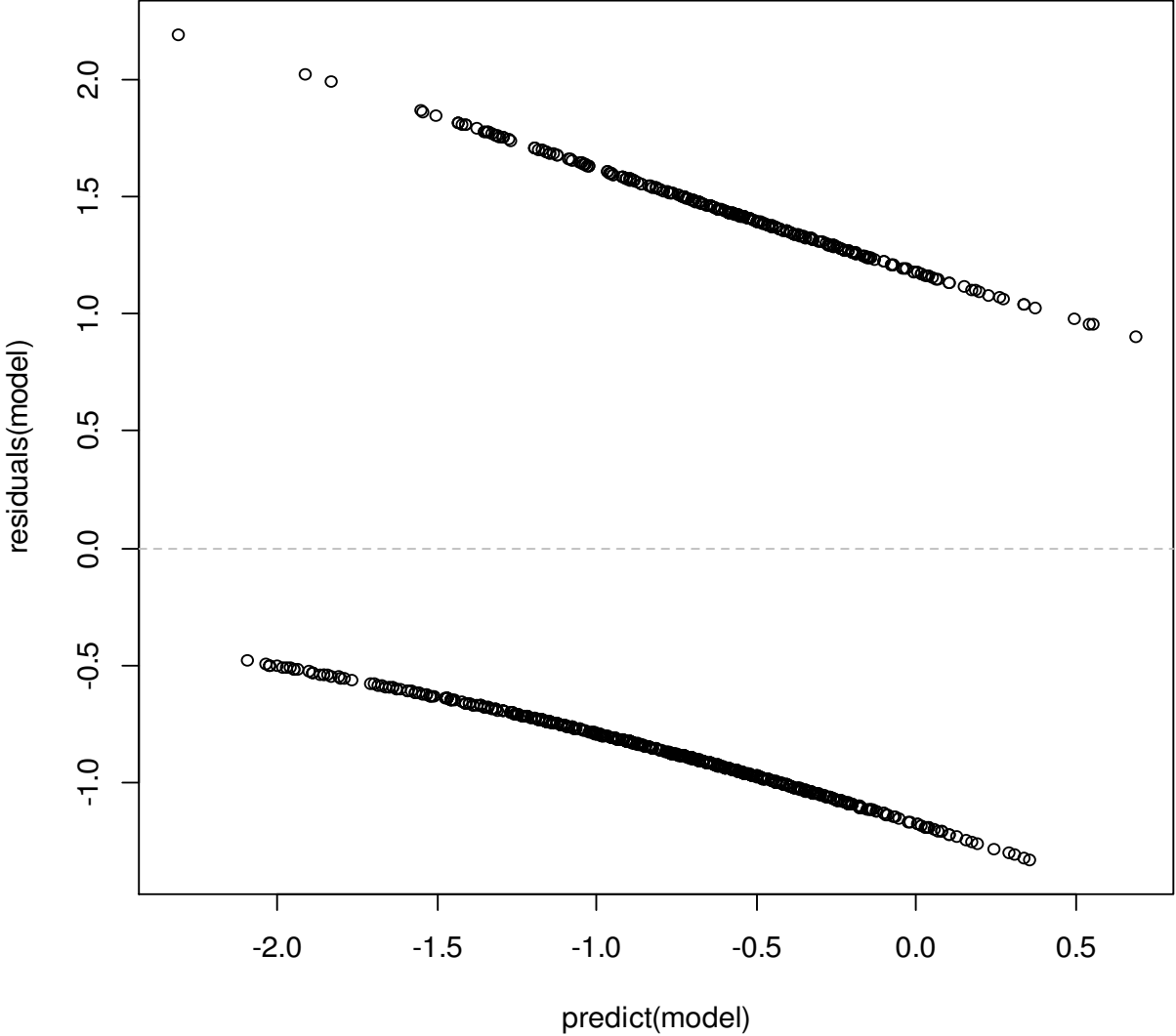
Variable	Definition
Gender	Gender of the individuals: 1 female, 0 male
Age	Age of individuals
Education	Education level achievement: 0 secondary education or lower level, 1 tertiary education or higher
Income	Quintile monthly household gross income: from the lowest quintile level to the highest quintile level
Financial Account	An individual has a current account at a financial institution: 0 no, 1 yes
Postal Account	An individual has a current account at a postal office: 0 no, 1 yes
Multi-purpose Account	Financial account purpose, 0 transactional or business reasons only, 1 both reasons together
Debit Card	An individual has a debit card: 0 no, 1 yes
Credit Card	an individual has a credit card: 0 no, 1 yes
Checks	In the last 12 months an individual used checks to make payments: 0 no, 1 yes
Electronic Payment	In the last 12 months an individual used the electronic payment system to make payments: 0 no, 1 yes
Receiving Salary	In the last 12 months an individual received his own salary from work or selling goods in his current account: 0 no, 1 yes
Receiving Transfers	In the last 12 months an individual received government transfers in his current account: 0 no, 1 yes
Receiving from Family	In the last 12 months an individual received money from his own family, which lives away, in his current account: 0 no, 1 yes
Sending to Family	In the last 12 months an individual sent income to his own family members, which live away, in their current account: 0 no, 1 yes
Savings	In the last 12 months an individual saved or set aside any money: 0 no, 1 yes
Saving to expenses	In the last 12 months an individual saved money for future, in order to make expenses, such as education, and wedding expenses, or big consumption expenditures: 0 no, 1 yes
Saving to Emergency	In the last 12 months an individual saved money for emergencies or for low income periods: 0 no, 1 yes
Financial Institution Club	In the last 12 months an individual saved money at a financial institution: 0 no, 1 yes In the last 12 months someone saved money using an informal savings club or a person outside one's family: 0 no, 1 yes
Borrowing4	In the last 12 months an individual borrowed money from a financial institution: 0 no, 1 yes
Borrowing1	In the last 12 months an individual borrowed money from a credit shop using instalment credit or buying on a credit: 0 no, 1 yes
Borrowing2	In the last 12 months someone borrowed money from one's family or one's friends: 0 no, 1 yes
Borrowing3	In the last 12 months an individual borrowed money from private lenders: 0 no, 1 yes
Loan	Currently, an individual has taken out a mortgage to buy a house: 0 no, 1 yes
Income Poverty	Income poverty using the variable income. 0 means being not poor: if income=3 or income=4 or income=5, representing the three highest income quintiles. 1 means being poor: if income=1 or income=2, representing the first two income quintiles
Rich to Poor	Movement from rich to poor, using the variable income. 0 means not poor: if income=4, or income=5. 1 means being poor: if income=1, or income=2; missing values if income=3
Mild Income Poverty	Mild income poverty, using the variable income. 0 means being not poor: if income=4, income=5. 1 means being poor: if income=1, income=2, income=3
Rich to Middle	Movement from the richest quintiles to the mid-quintile of the income distribution, using the variable income. 0 means being rich, if income=4 or income=5. 1 means being middle class, if income=3; missing values if income=1 or income=2

First model: diagnostic graphs

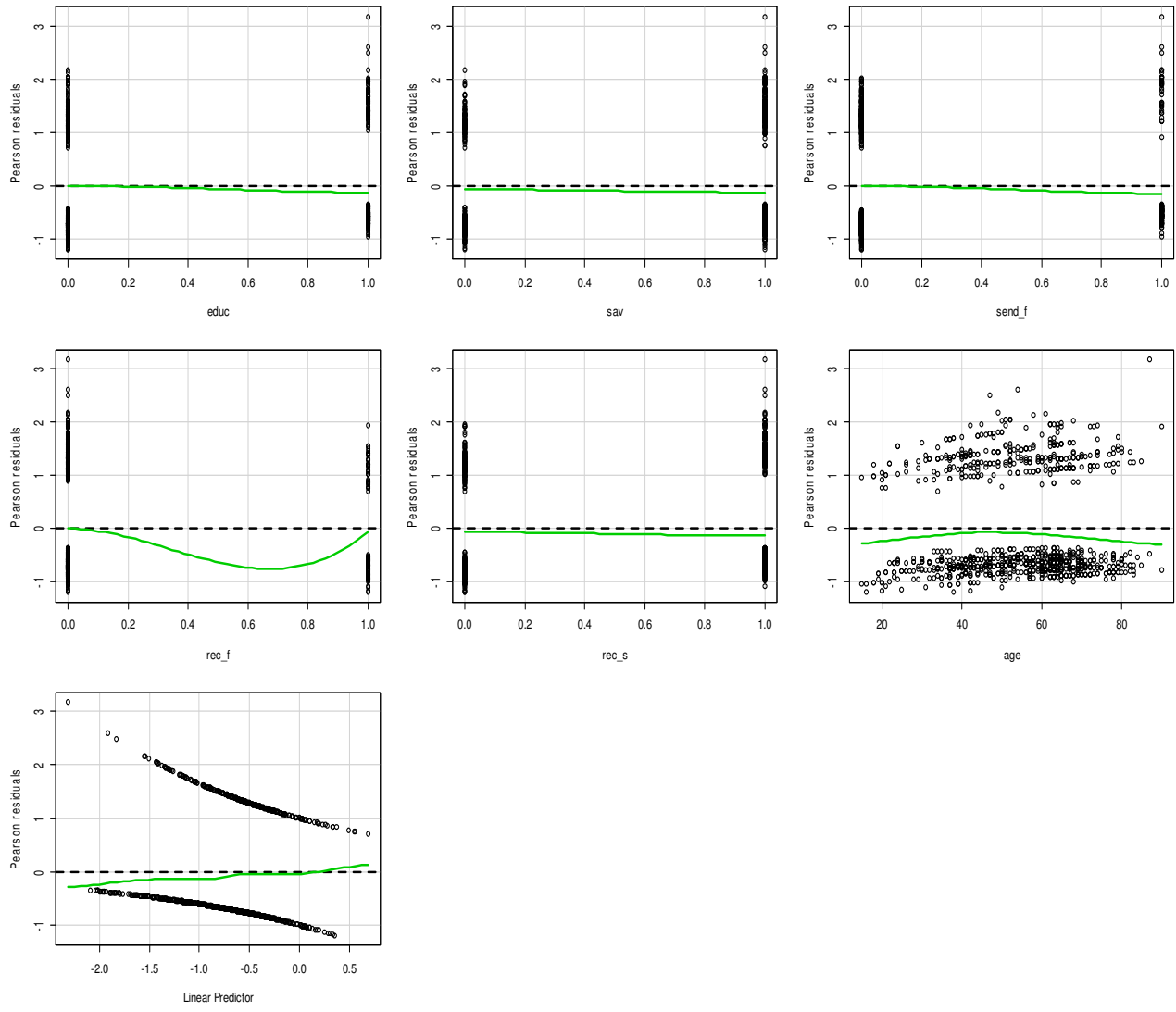
Graph 1



Graph 2

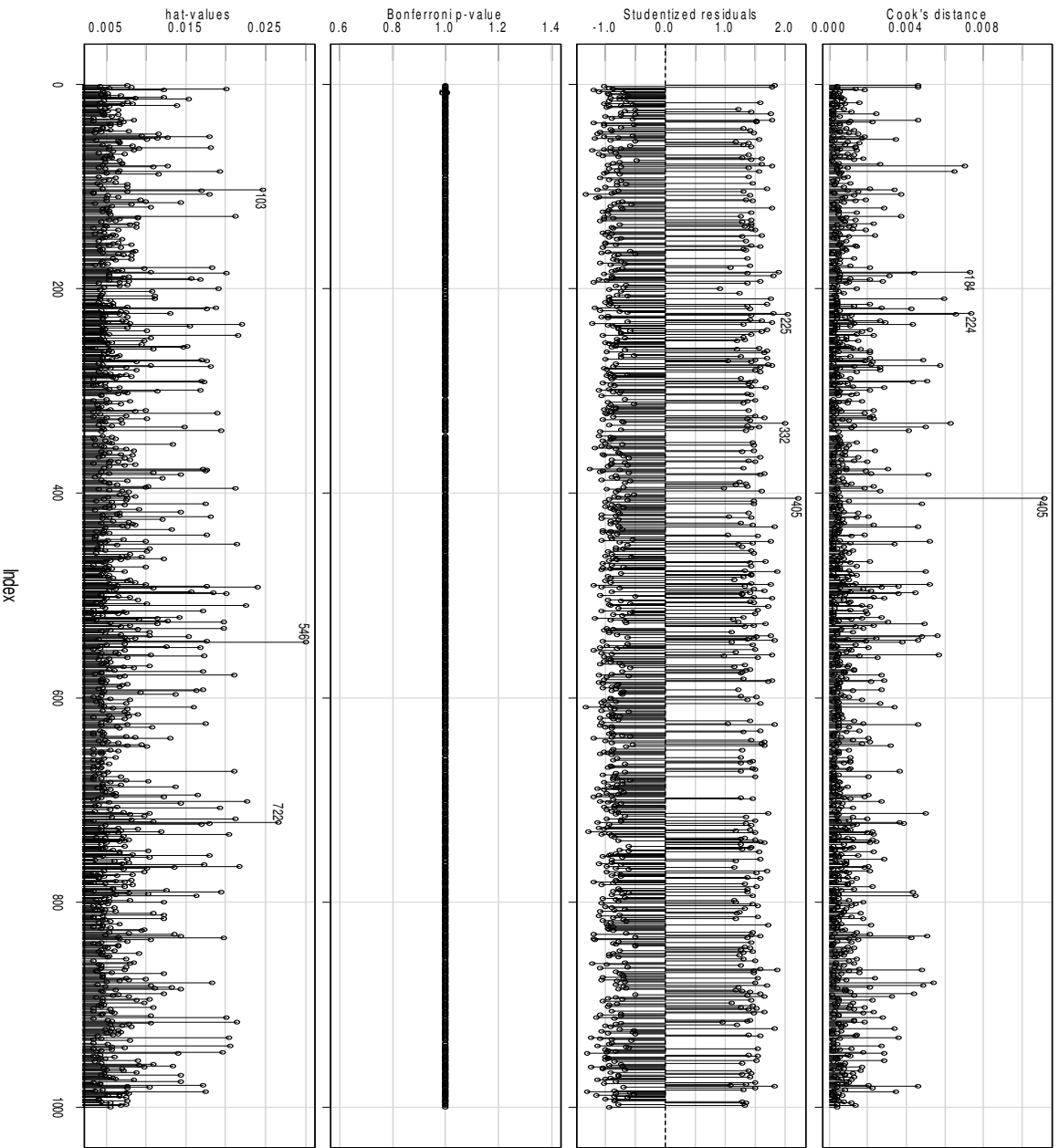


Graph 3

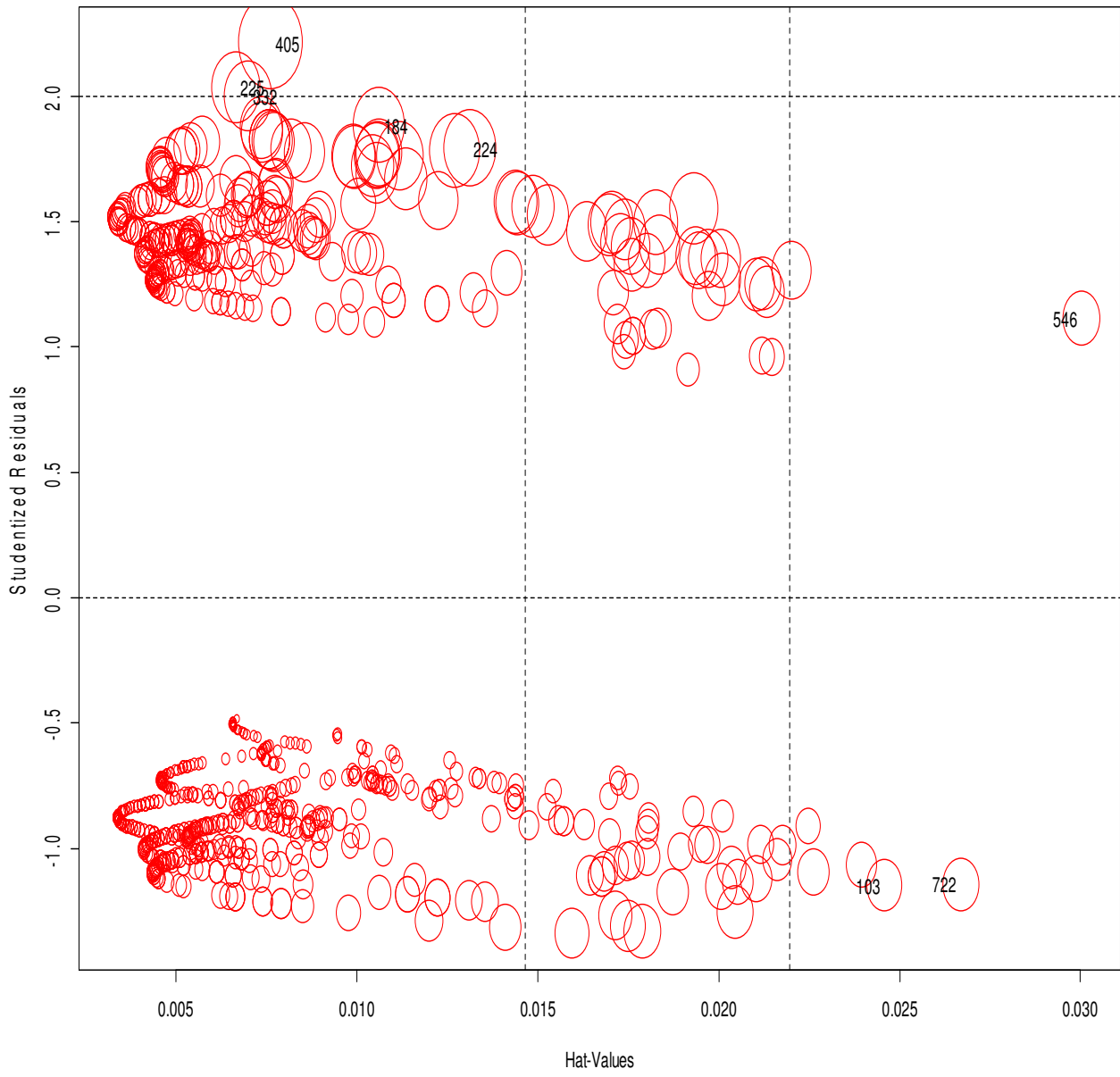


Graph 4

Diagnostic Plots

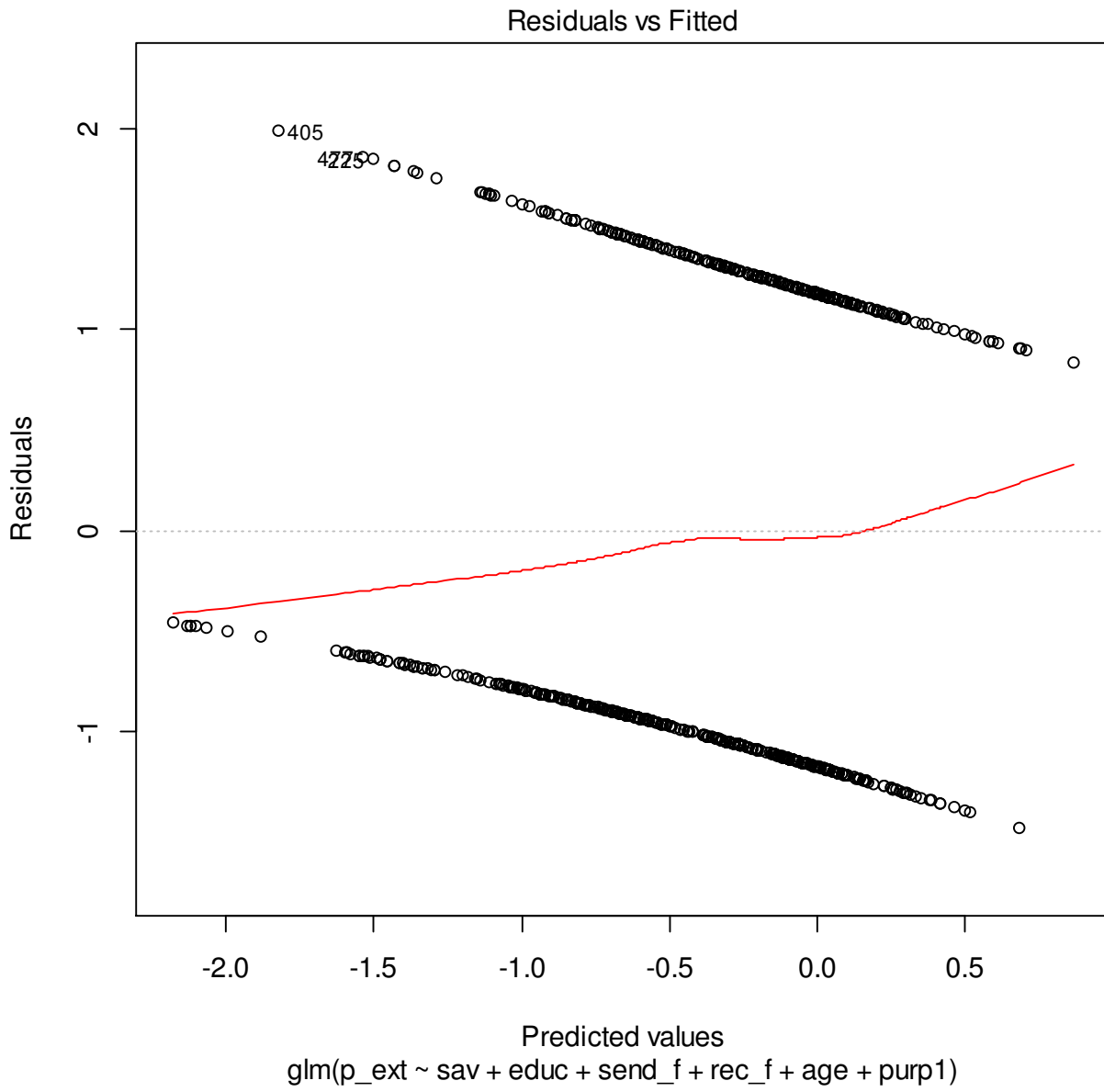


Graph 5

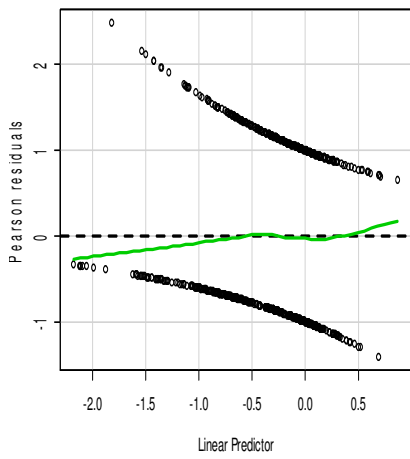
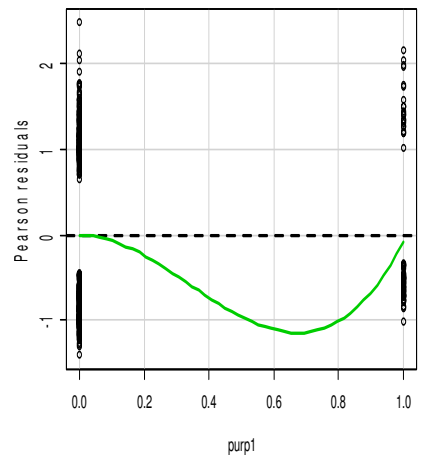
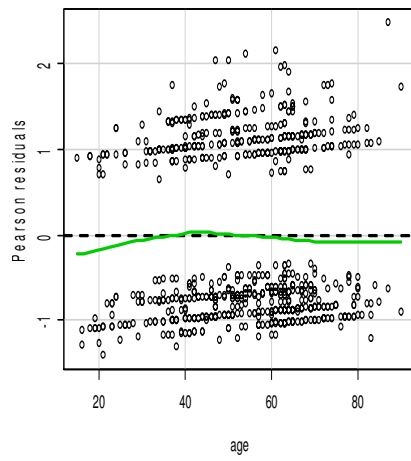
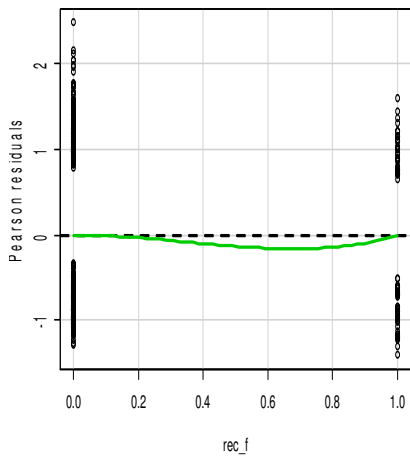
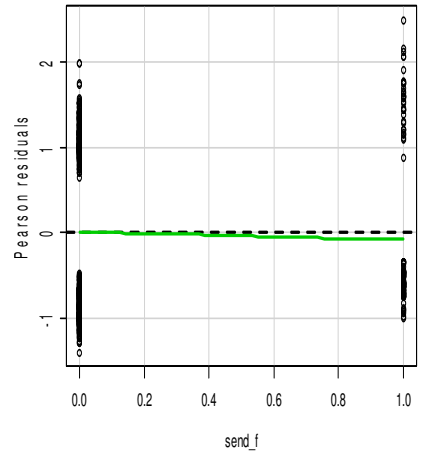
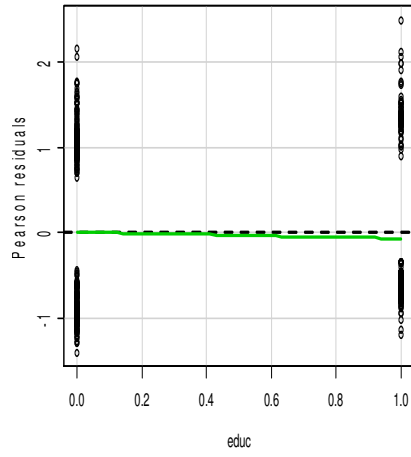
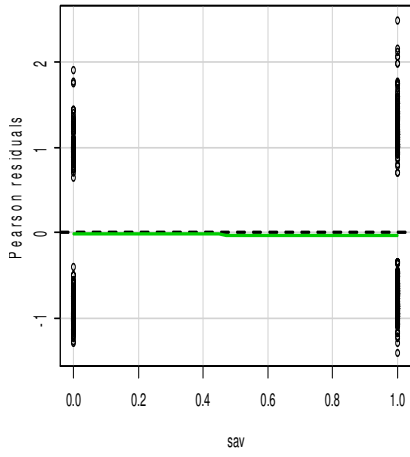


Second model: diagnostic graphs

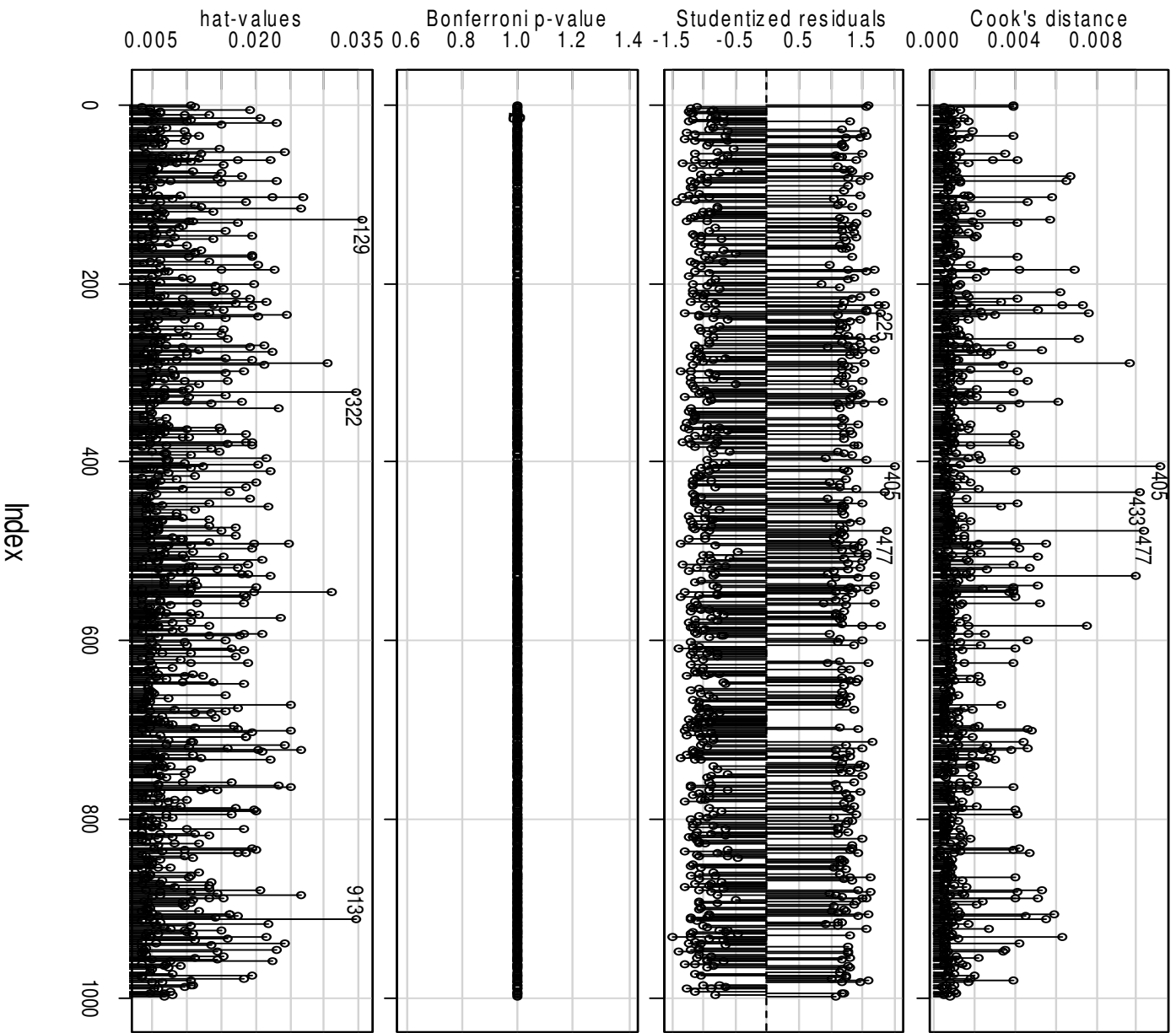
Graph 6



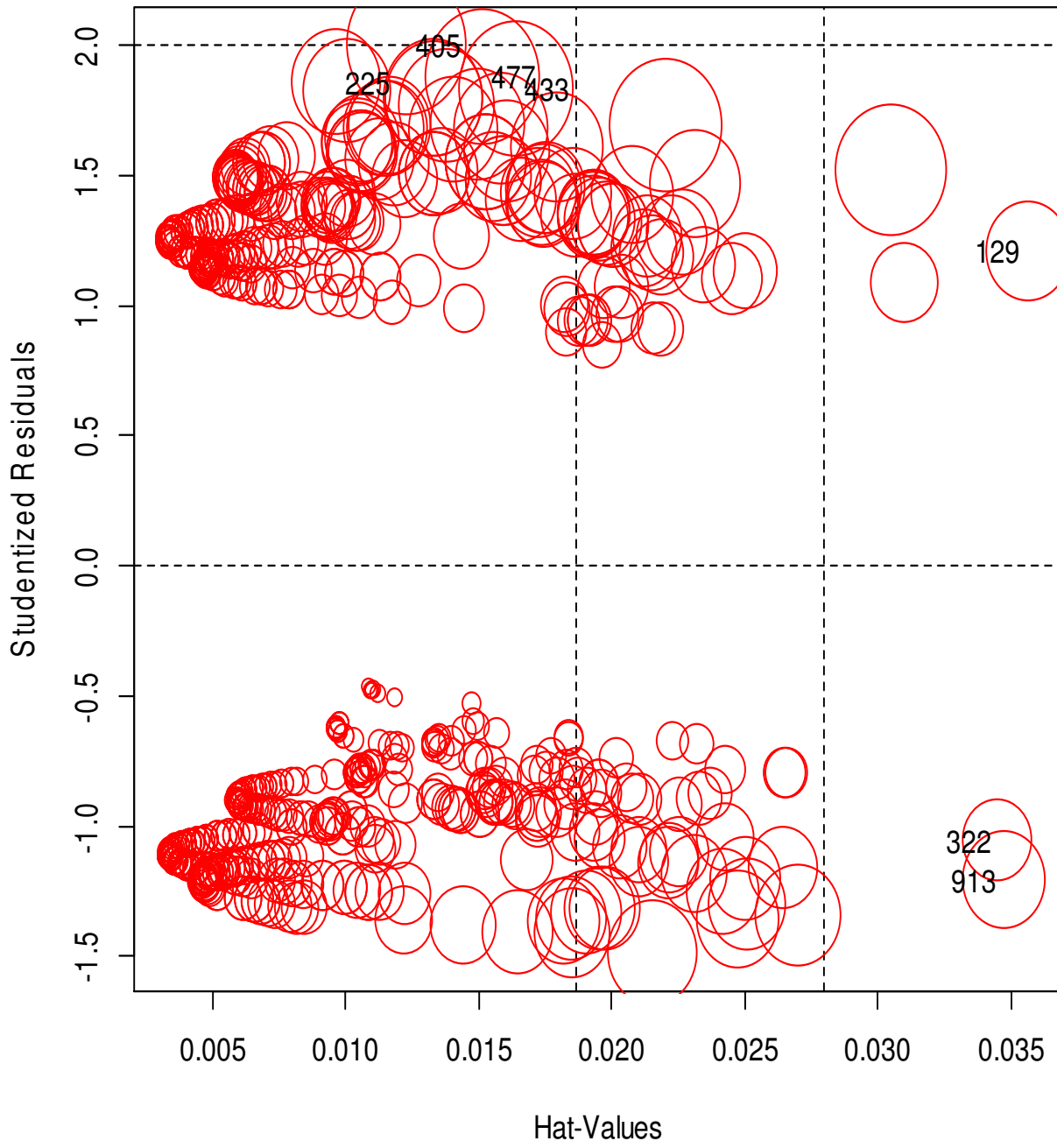
Graph 7



Diagnostic Plots

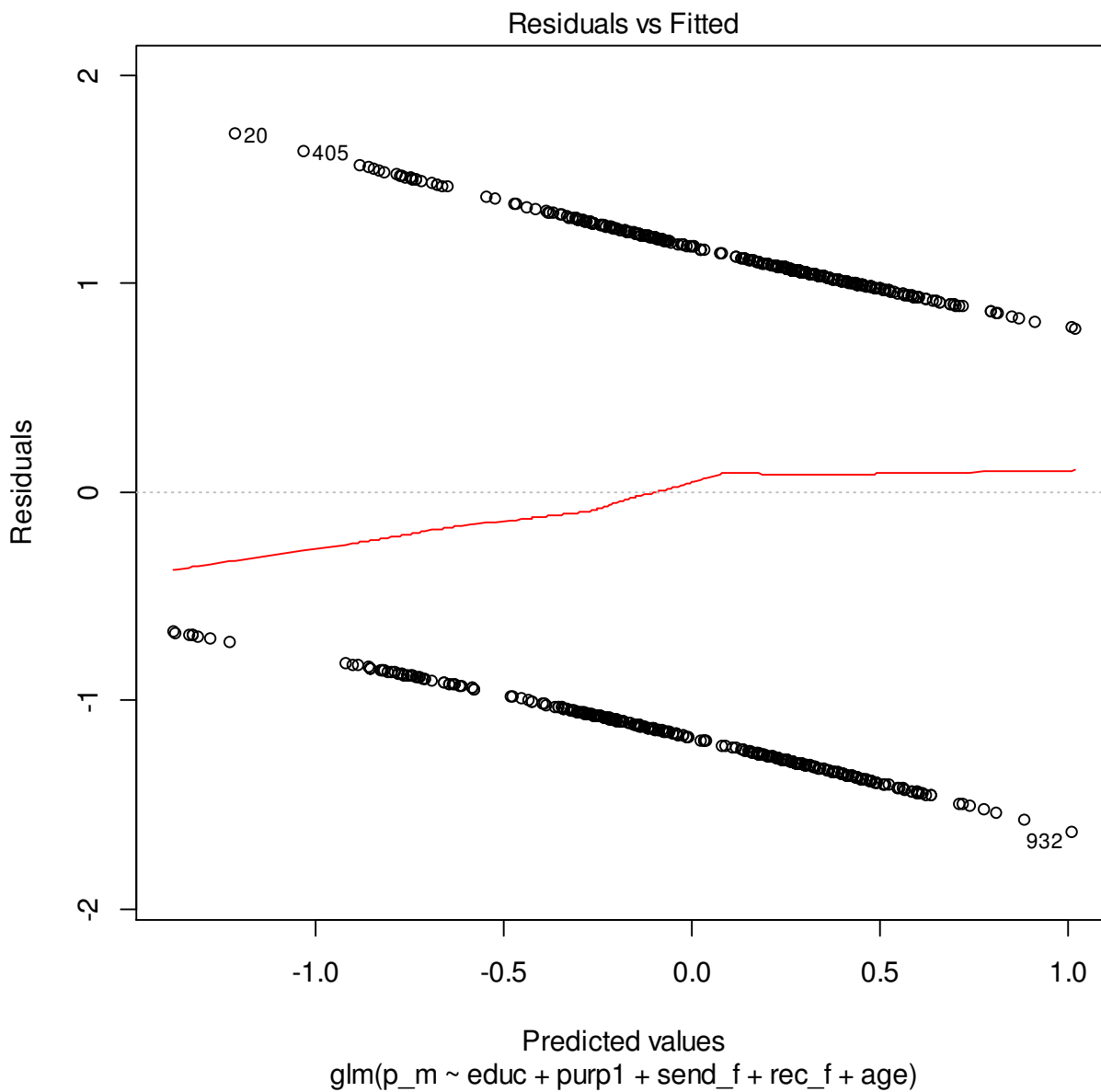


Graph 9

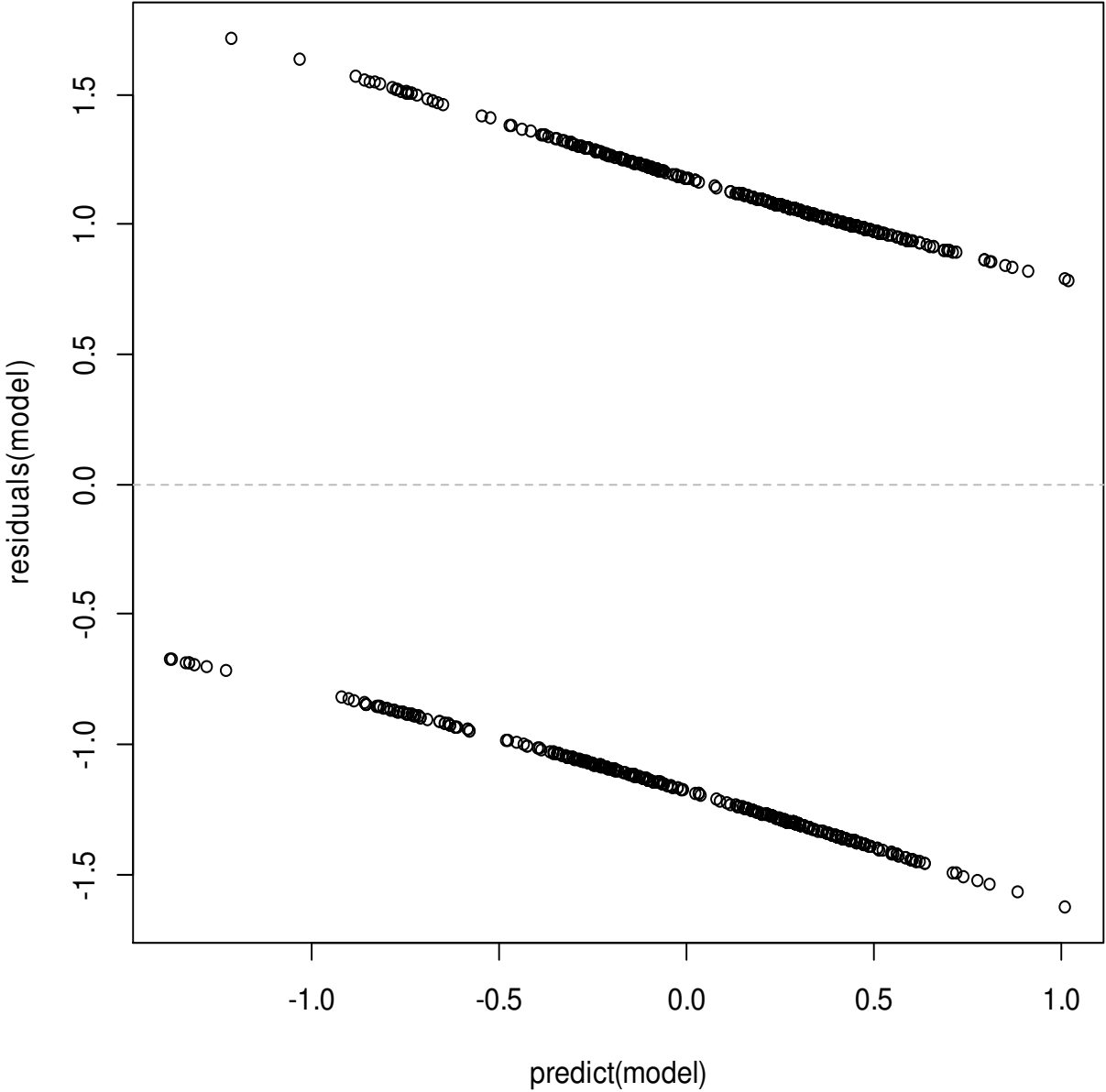


Third model: diagnostic graphs

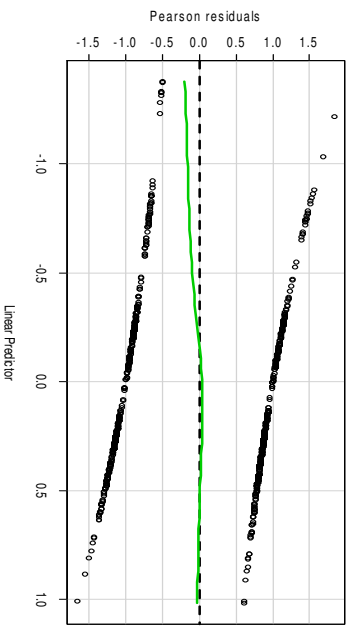
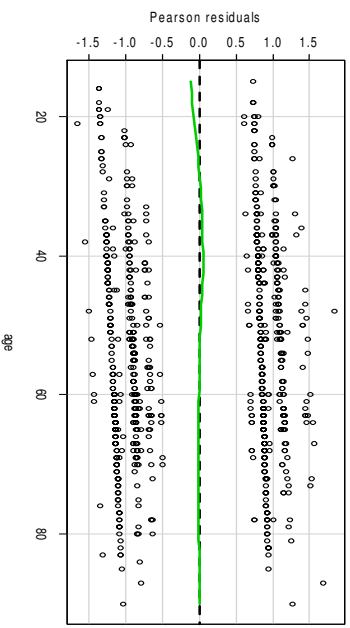
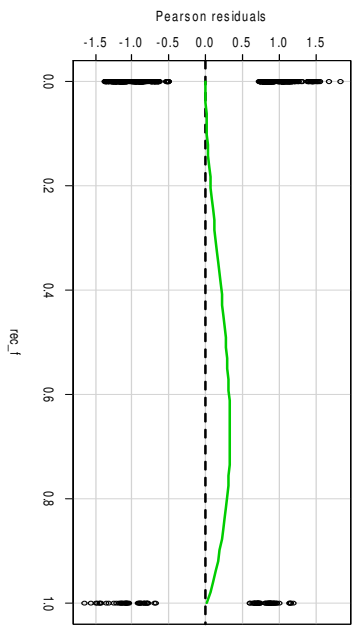
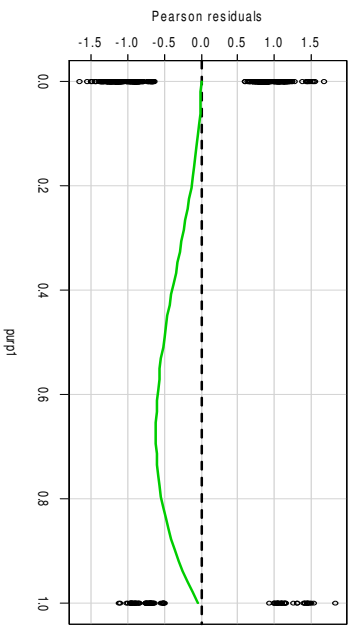
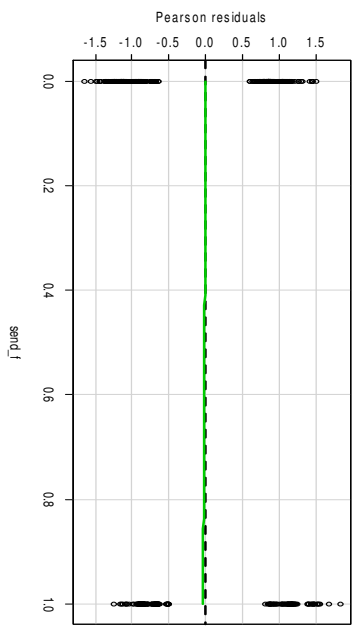
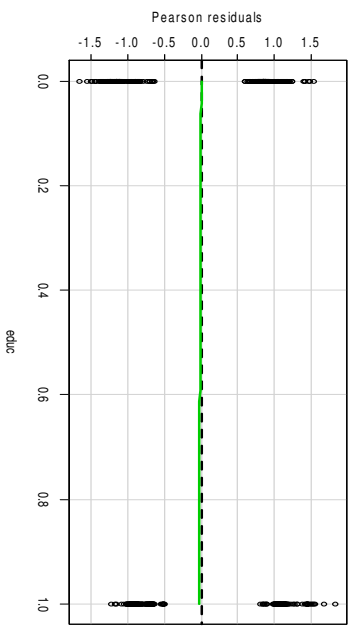
Graph 10



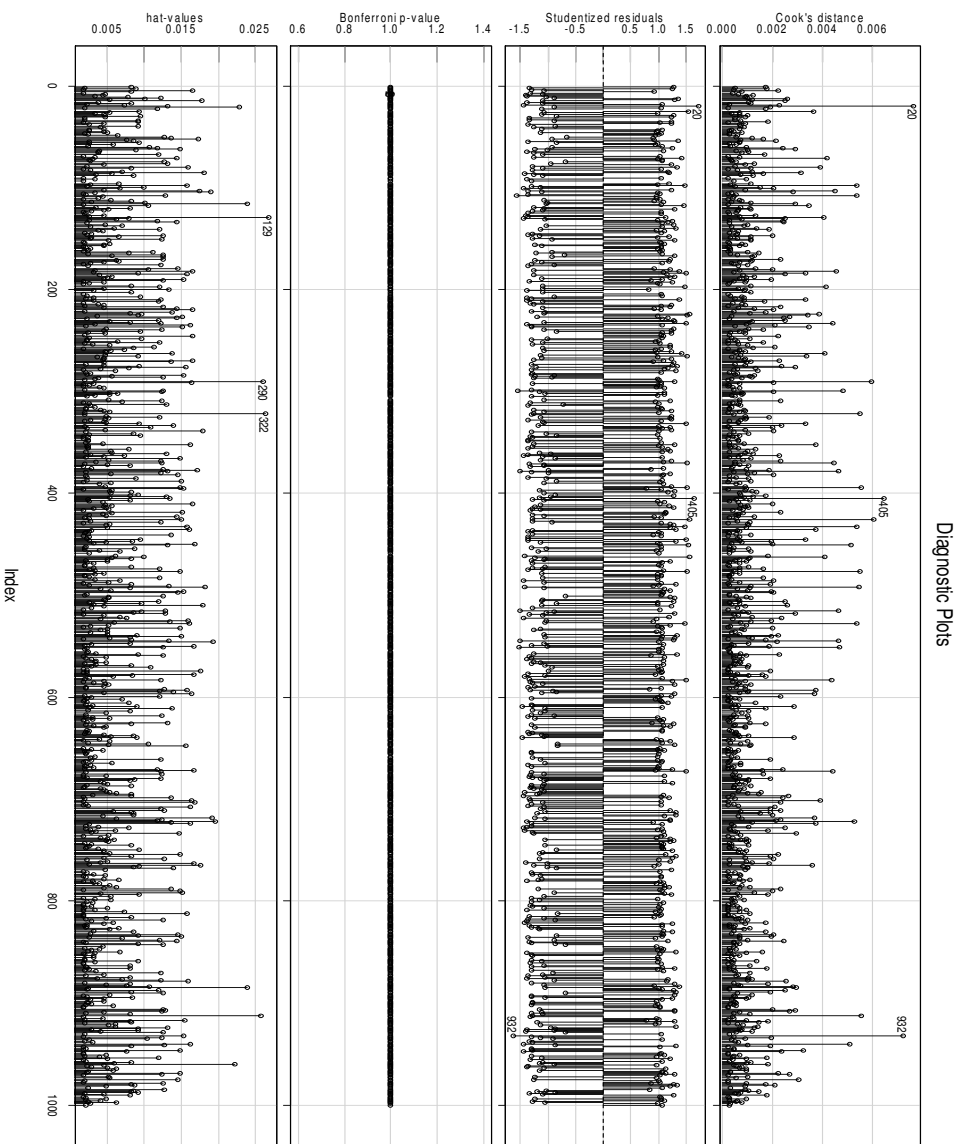
Graph 11



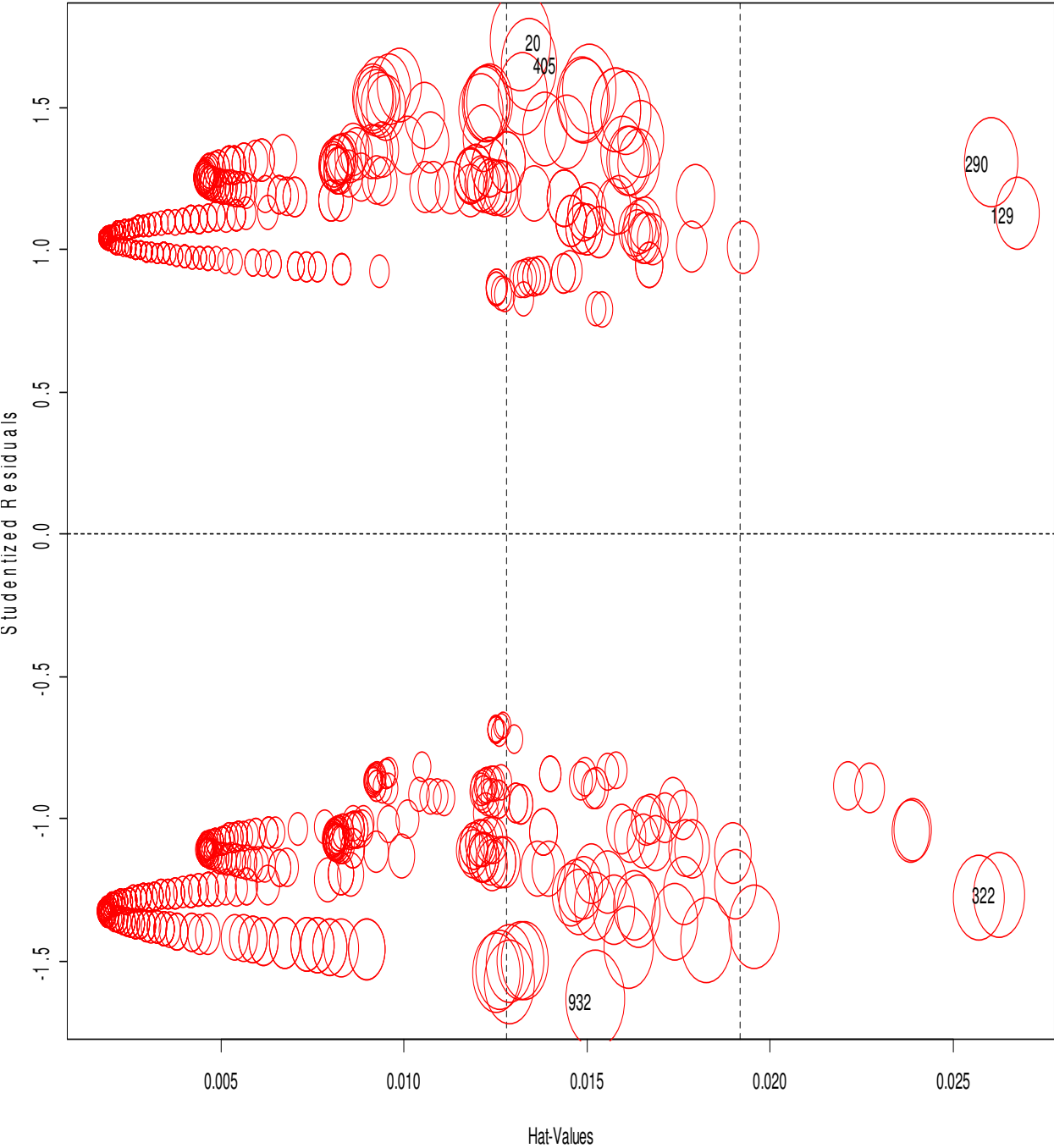
Graph 12



Graph 13

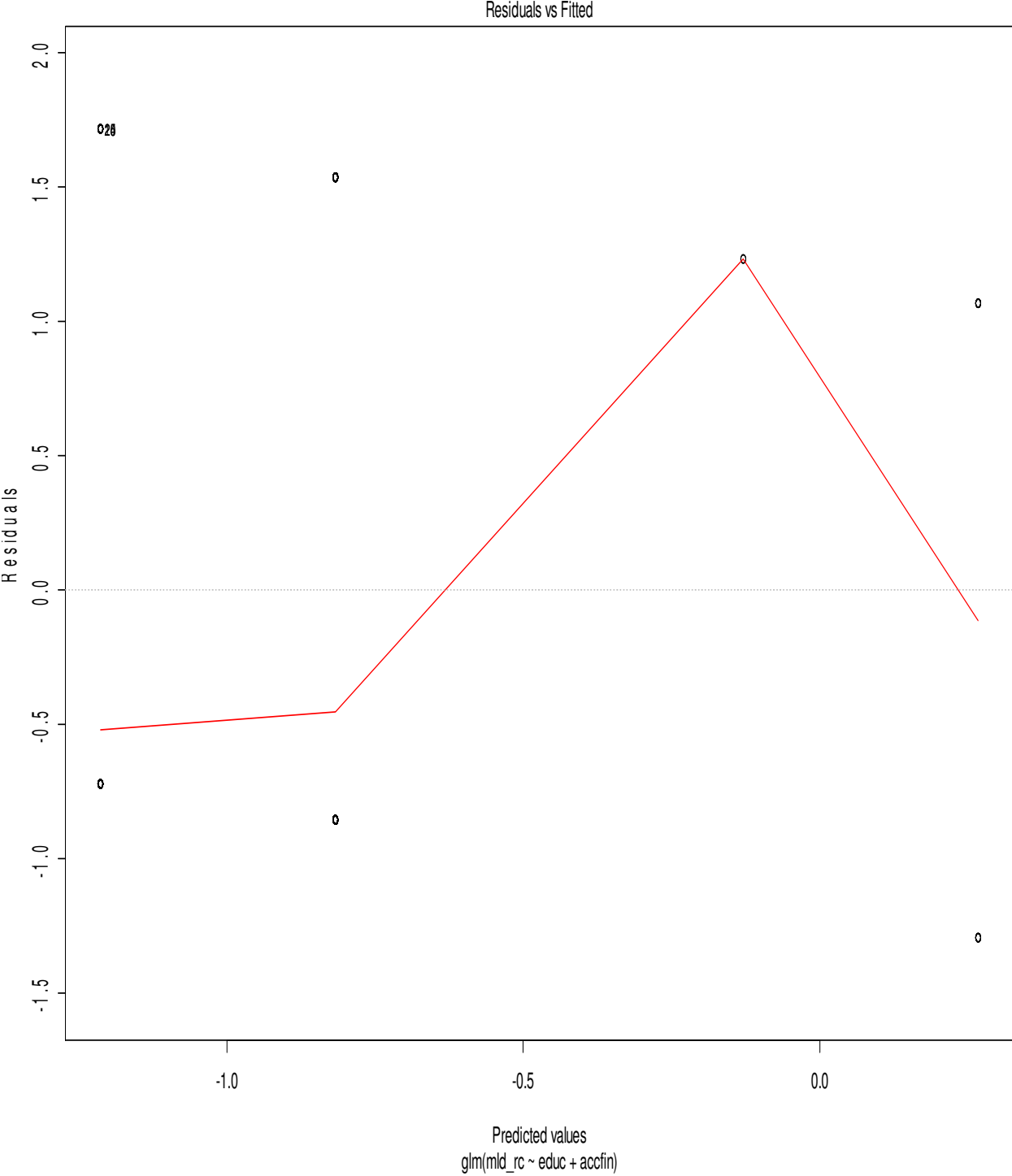


Graph 14

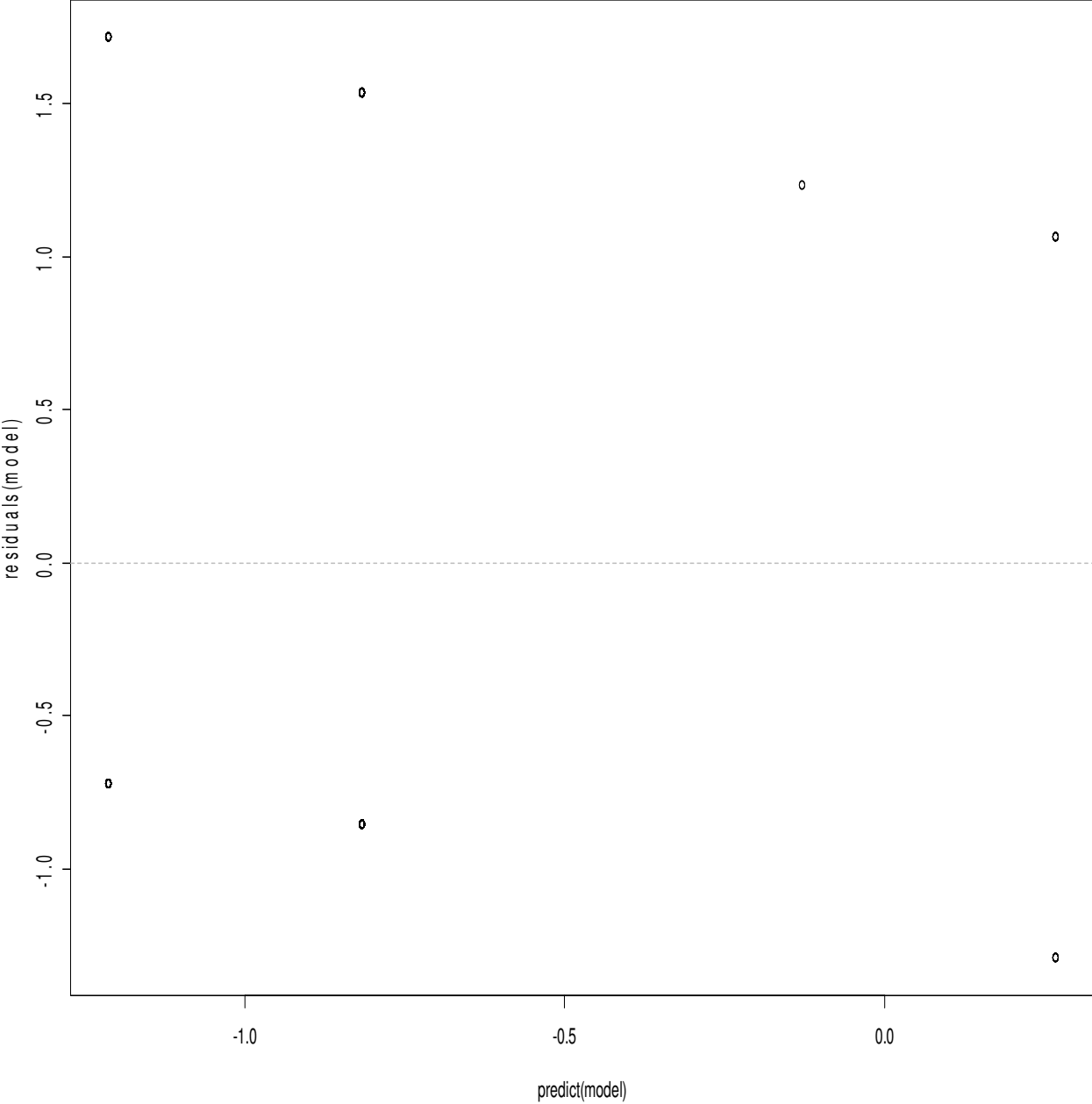


Fourth model: diagnostic graphs

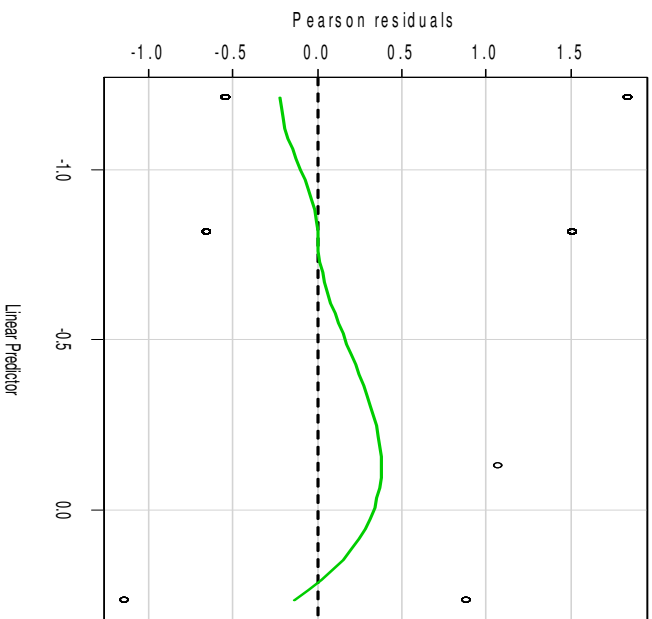
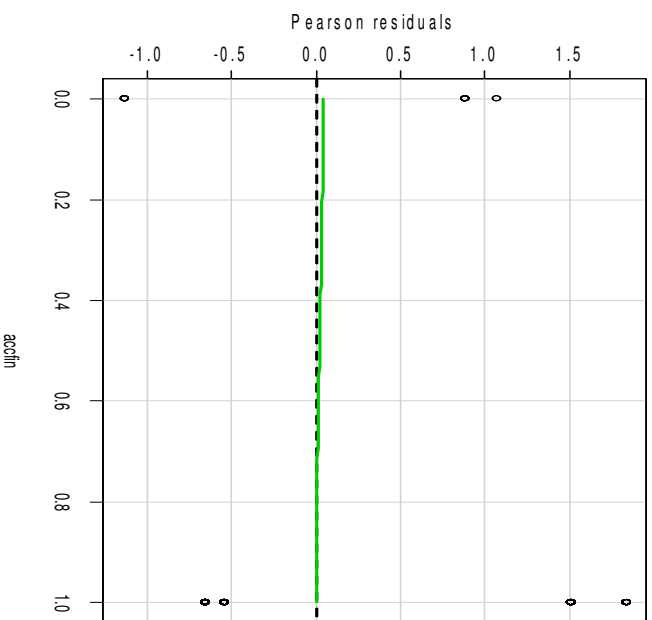
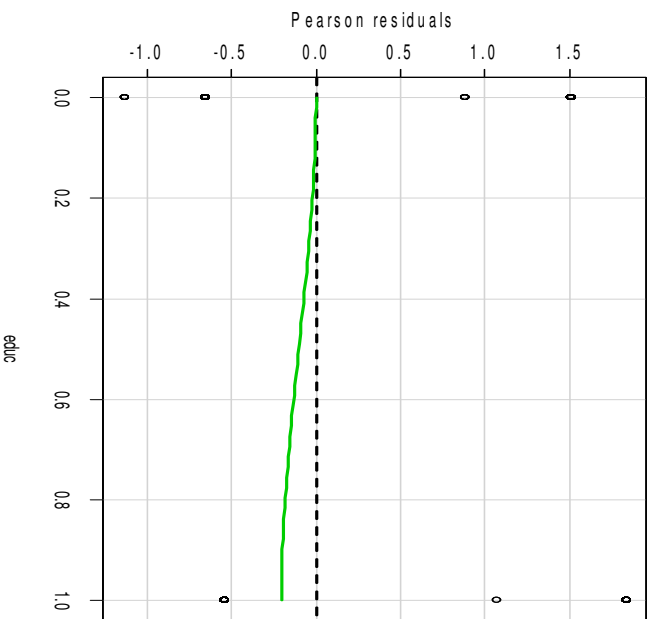
Graph 15



Graph 16

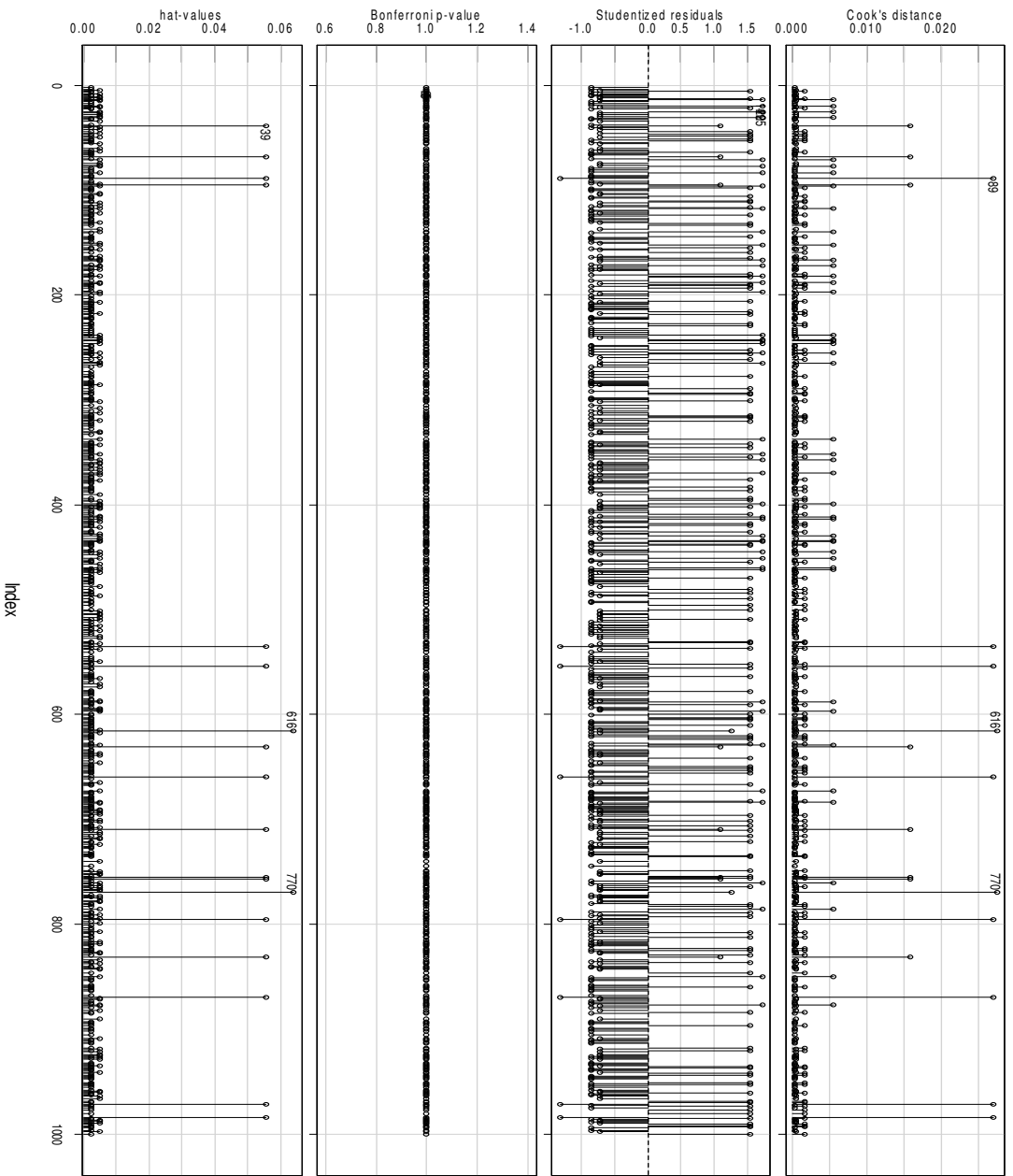


Graph 17



Graph 18

Diagnostic Plots



Graph 19

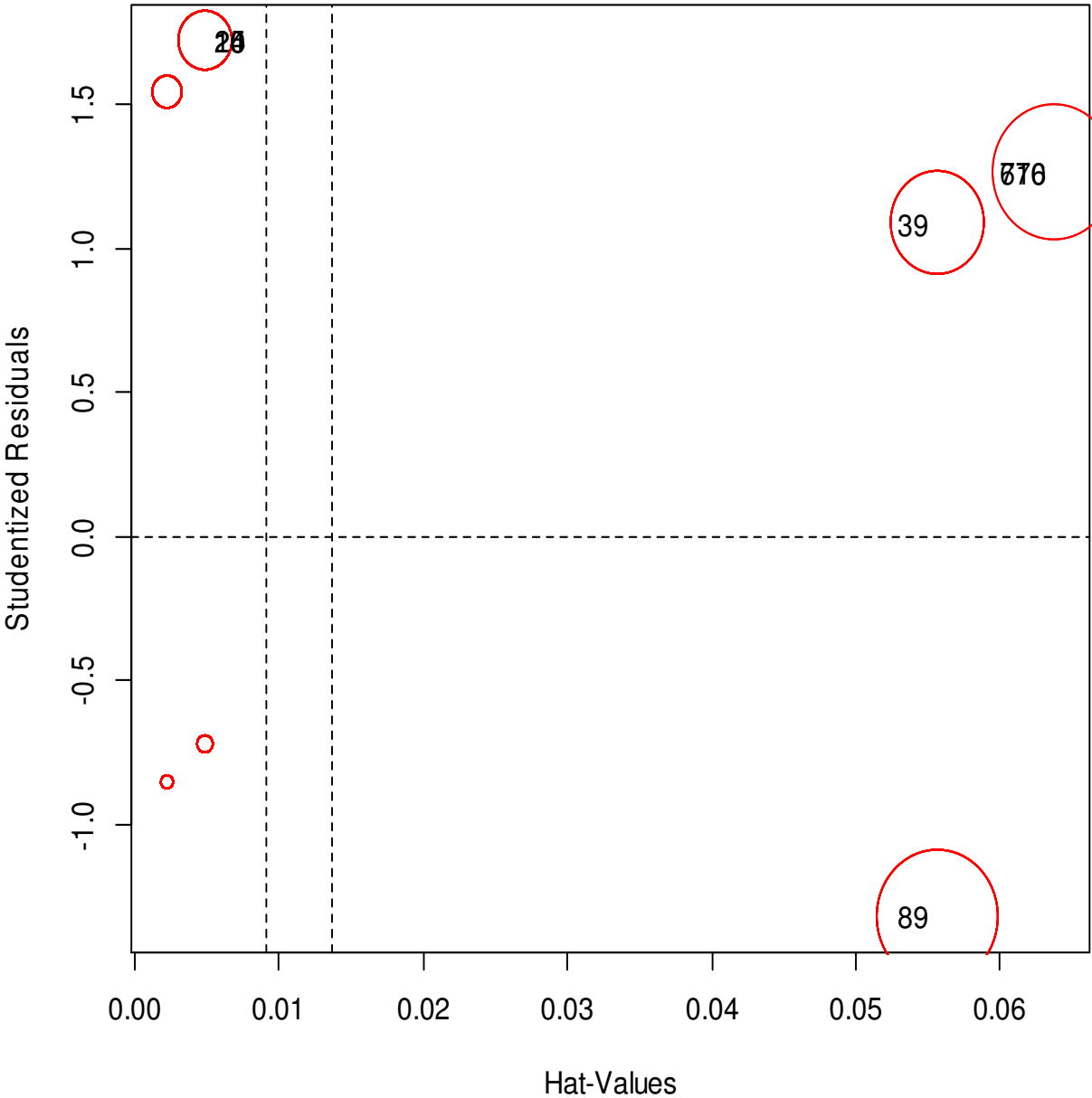


Table 2: Descriptive statistics of the variables

	Number of observations*	Mean value	Standard deviation
Gender	1,000	0.54	0.49
Age	1,000	53.99	15.39
Education	990	0.27	0.44
Financial Account	993	0.96	0.17
Postal Account	992	0.83	0.37
Multi-purpose Account	948	0.11	0.31
Debit Card	992	0.14	0.35
Credit Card	992	0.71	0.45
Checks	982	0.02	0.14
Electronic Payment	983	0.49	0.5
Receiving Salary	982	0.57	0.49
Receiving Transfer	982	0.52	0.49
Receiving from_Family	982	0.09	0.29
Sending to_Family	981	0.17	0.37
Savings	975	0.65	0.47
Saving to Expenses	736	0.66	0.47
Saving to Emergency	737	0.82	0.38
Financial Institution	738	0.84	0.36
Club	739	0.11	0.31
Borrowing4	994	0.07	0.25
Borrowing1	995	0.11	0.31
Borrowing2	995	0.03	0.18
Borrowing3	993	0.004	0.06
Loan	993	0.18	0.38
Income Poverty	1,000	0.33	0.47
Extreme Poverty	807	0.41	0.49
Income Poverty1	1,000	0.52	0.49
Rich to Middle	664	0.29	0.45

* number of observations without the missing values