# Binary Choice

or dummy variables as dependent variables.

**Example of binary choice**

discuss a simple example, from Munnell et al. [1996].

Customer comes into a bank and asking for a loan.

The bank can say yes or no. What does the bank base this answer on?

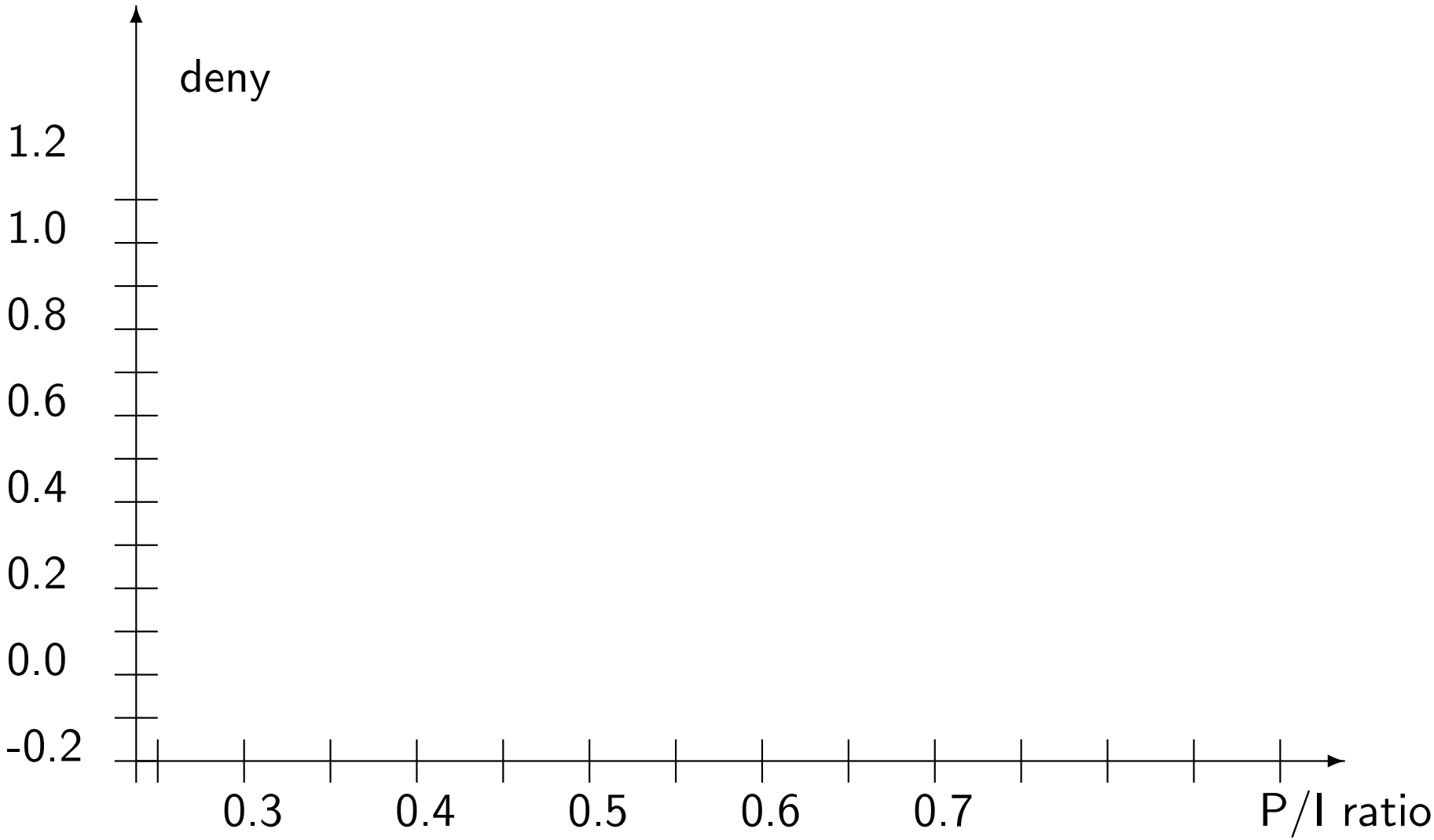
Well, one typical question is the amount of income of the applicant.

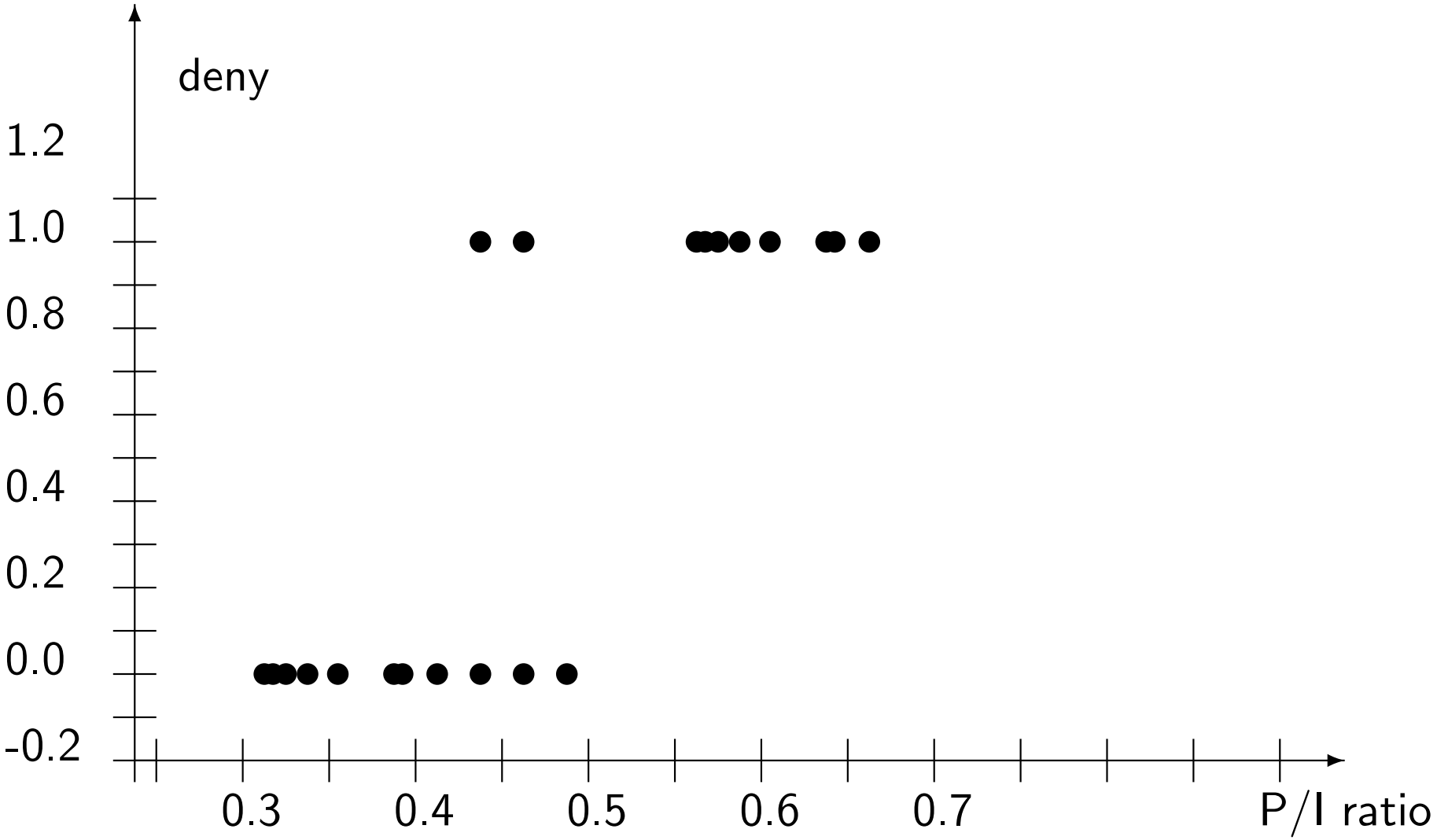
How big is the monthly payment of the loan compared to the monthly income

– the ratio of debt payments to income (P/I ratio).

Suppose this is the only number thought relevant for the banks decision.

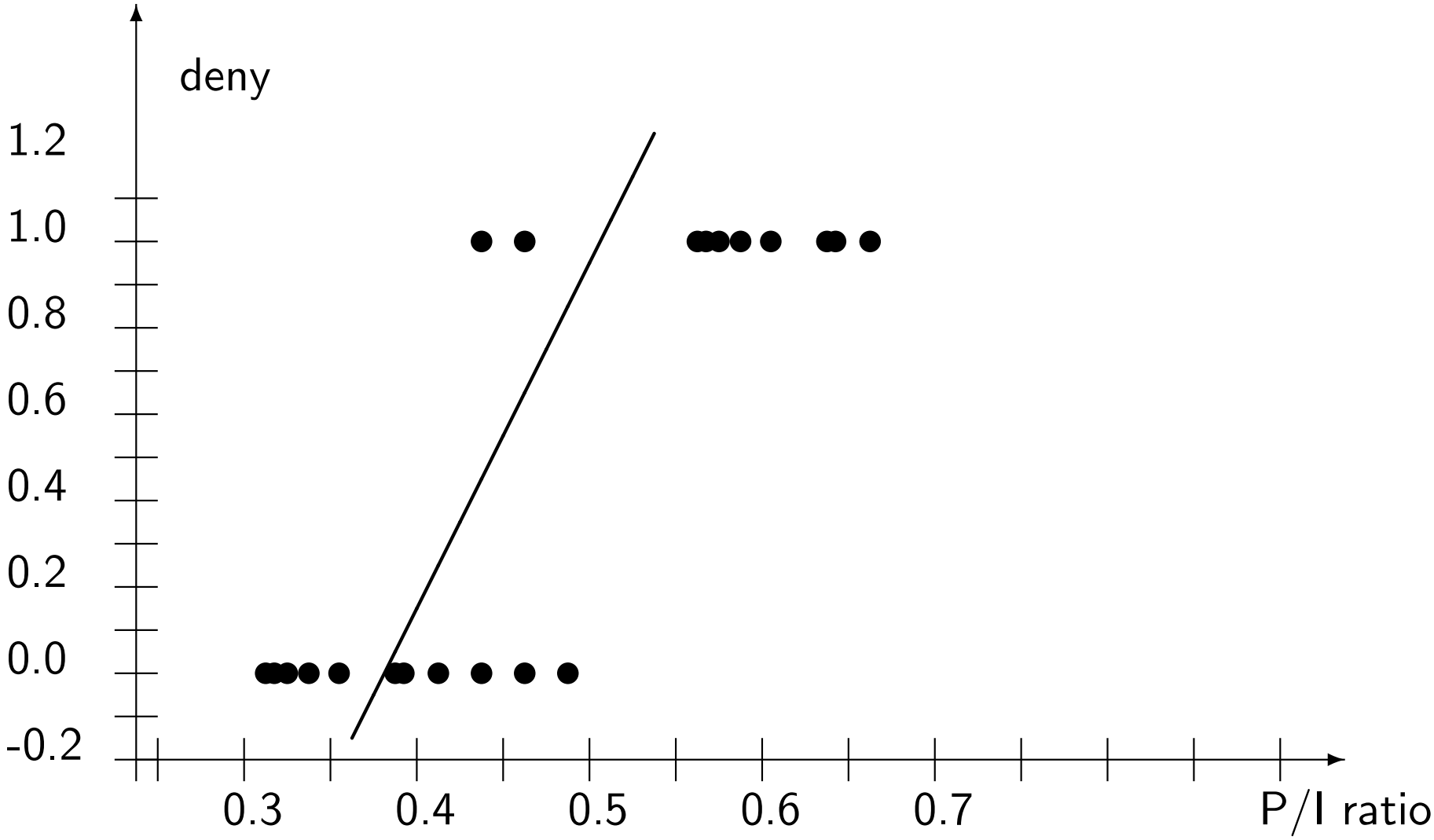
Estimate relationship betwen P/I ratio based on bank decisions.
Data: Bunch of decisions (0/1) and P/I ratios.




deny
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
0.3
0.4
0.5
0.6
0.7
P/I ratio

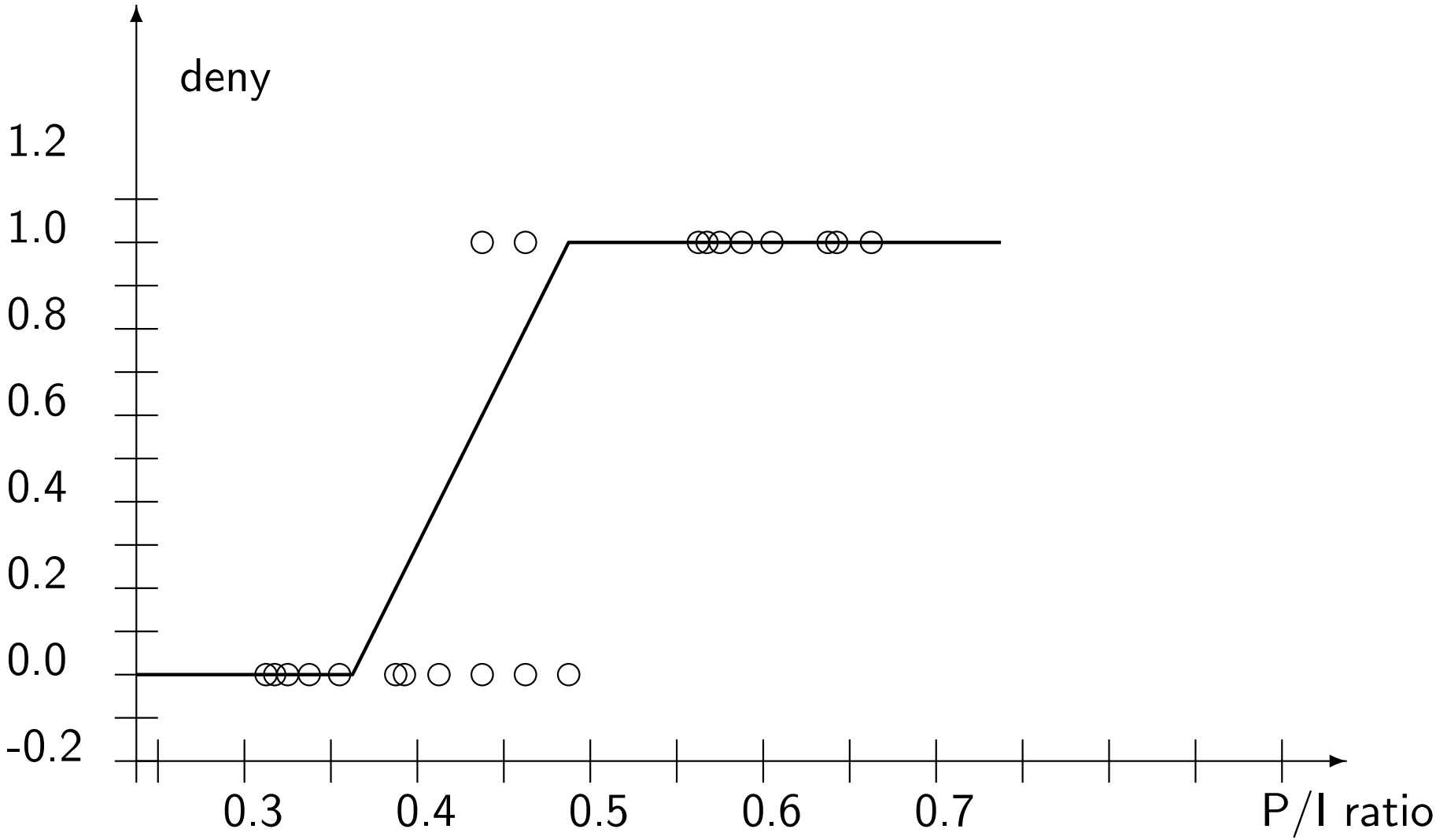
Fit a regression:

$$\text{Deny} = a + b\text{P/I ratio} + e$$

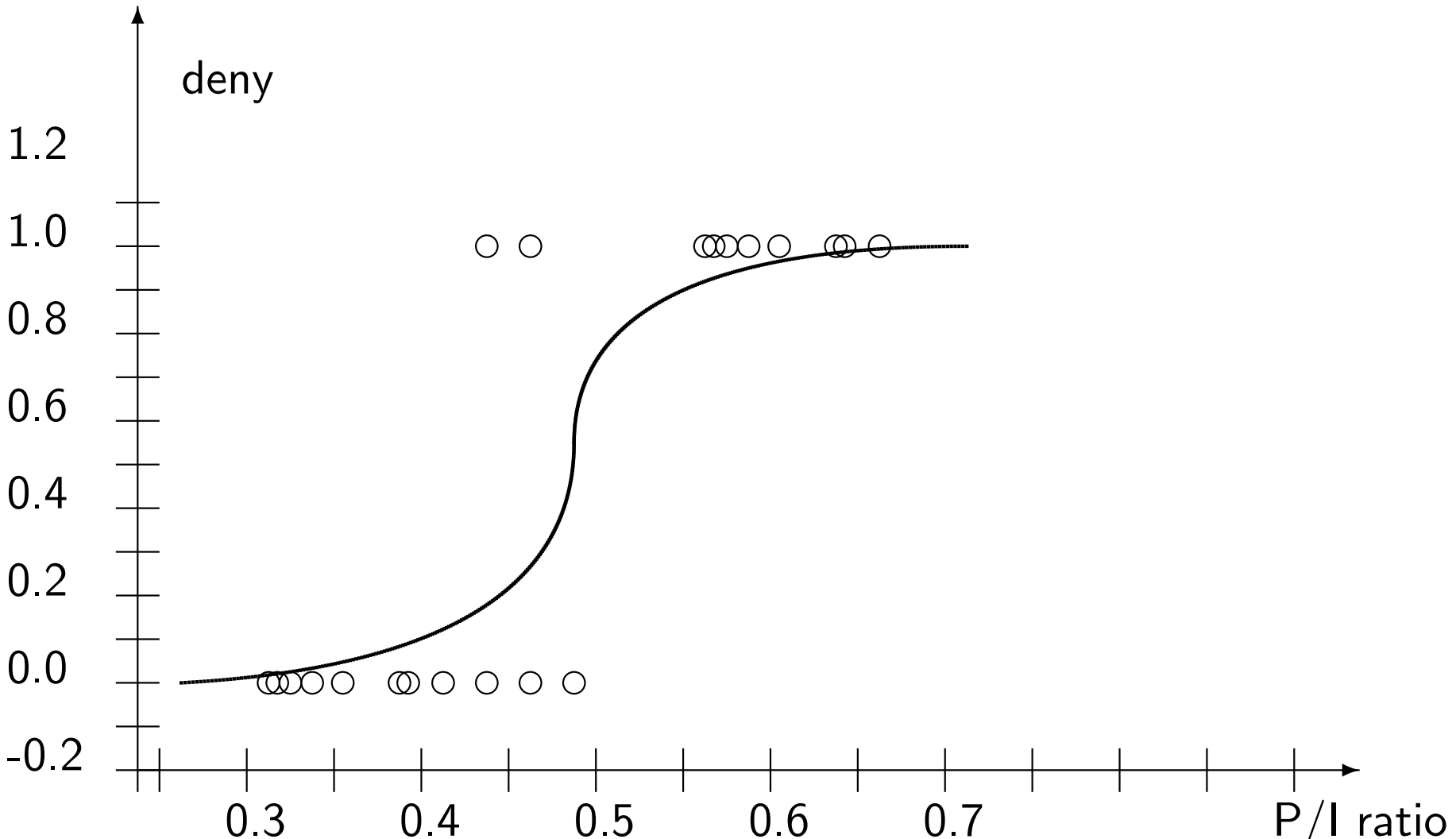



Problems.

Possible fix: truncation



Methods used in Practice: Logit/Probit.
Maximum Likelihood estimation relationship between explanatory variables and probability(dependent variable) - ensuring that dependent variable between 0/1



Alicia H Munnell, Geoffrey M B Tootell, Lynne E Browne, and James McEneaney. Mortgage lending in Boston: Interpreting HMDA data. *American Economic Review*, pages 25–53, 1996.