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# Is debt avoidance a significant barrier to post-secondary education among under-represented groups?

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# Research Questions

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- It is believed that students or potential students belonging to low SES families, Aboriginal families or first generation students' families are less likely to be willing to borrow (doubt benefits of PSE, low likelihood of success).
- How big a problem is debt aversion among these populations?



# Using experiments to measure preferences?

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- Information used to design policy is mostly based on traditional empirical methodologies:
  - Outcome-based measures (multivariate analysis method)
  - Survey questions
  - Focus groups
- Experimental measures of preferences provide an additional source of information:
  - Potentially more accurate information
- Much more reliable than survey information or focus groups
  - Decisions involve real money; costly not to tell the truth
  - Anonymity further minimizes misinterpretation effects
  - Real, not hypothetical decisions
  - Control for situational variation by placing subjects in identical settings



# Sample

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- 1,250 12th graders and CEGEP students
- Manitoba, Ontario and Quebec and Saskatchewan
- Aboriginals
- Rural/Urban
- Low and High SES



# Participants

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	Total Population = 1248
High School	948
Rural (>40km U)	152
Male	577
Female	671
Work over 20 hours per week	794
Aboriginal	110
Low Income	218
Single Parent Family	123
First Generation PSE	352



# Data Sources

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- Student Survey (web)
- Parental Survey (Web or Tel)
- Numeracy Assessment
- Experimental Measures



# Protocol

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- Info packets delivered to selected schools
- Parental Consent  $\Rightarrow$  Parental Survey
- Students (pre-session) web survey
- In-school Session (\$20)
  - Practice Decisions (bingo ball cage)
  - Experimental Decisions
  - Numeracy Assessment
  - Payoff (private)



# Student Survey

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- Educational ambitions
- Expectations with regards to ambitions
- Perceived obstacles to pursuing PSE
- Financial means at student's disposal
- Debt aversion
- Experience with debt
- Educational background and experiences
- Parent's education and economic status
- Inter-temporal orientation (planning ability)
- Attitudes towards risk
- Aspiration level
- Engagement while in high school
- Perceptions of labour market conditions
- Perceptions of the cost of, and returns to, PSE





# Parental Survey

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- Expectation and aspirations for children
- Education
- Income
- Family size



# Numeracy Assessment

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- Measures how participants use math in every day life
- Most compact way to control for differences in ability among students or schools
- Marked inter-student variance that will interact with how they respond to experimental decisions
- There is also a more important link - numeracy skill is the single most important determinant of both high school completion and PSE participation rates



# Experimental Measures

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- Time Preferences
- Risk Preferences
- Education Choices



# Time Preferences

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## **NOTE TO PARTICIPANTS:**


- The first series of choices are offers of money at different dates. Choice A is always closer to the present than Choice B.
- If one of these decisions is picked with your random draw at the end of today's session, the money will be paid to you by cheque on the promised date.




# Example of Time Preference Decision

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You must choose A or B:

CHOICE A 

\$75 One week from today

CHOICE B 

\$87.50 One week and one month from today

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Decision 12  \$75 in one week

\$87.50 in one week and one month  
The additional **\$12.50** represents the money you would have earned in a savings account for one month at **200%** annual interest.



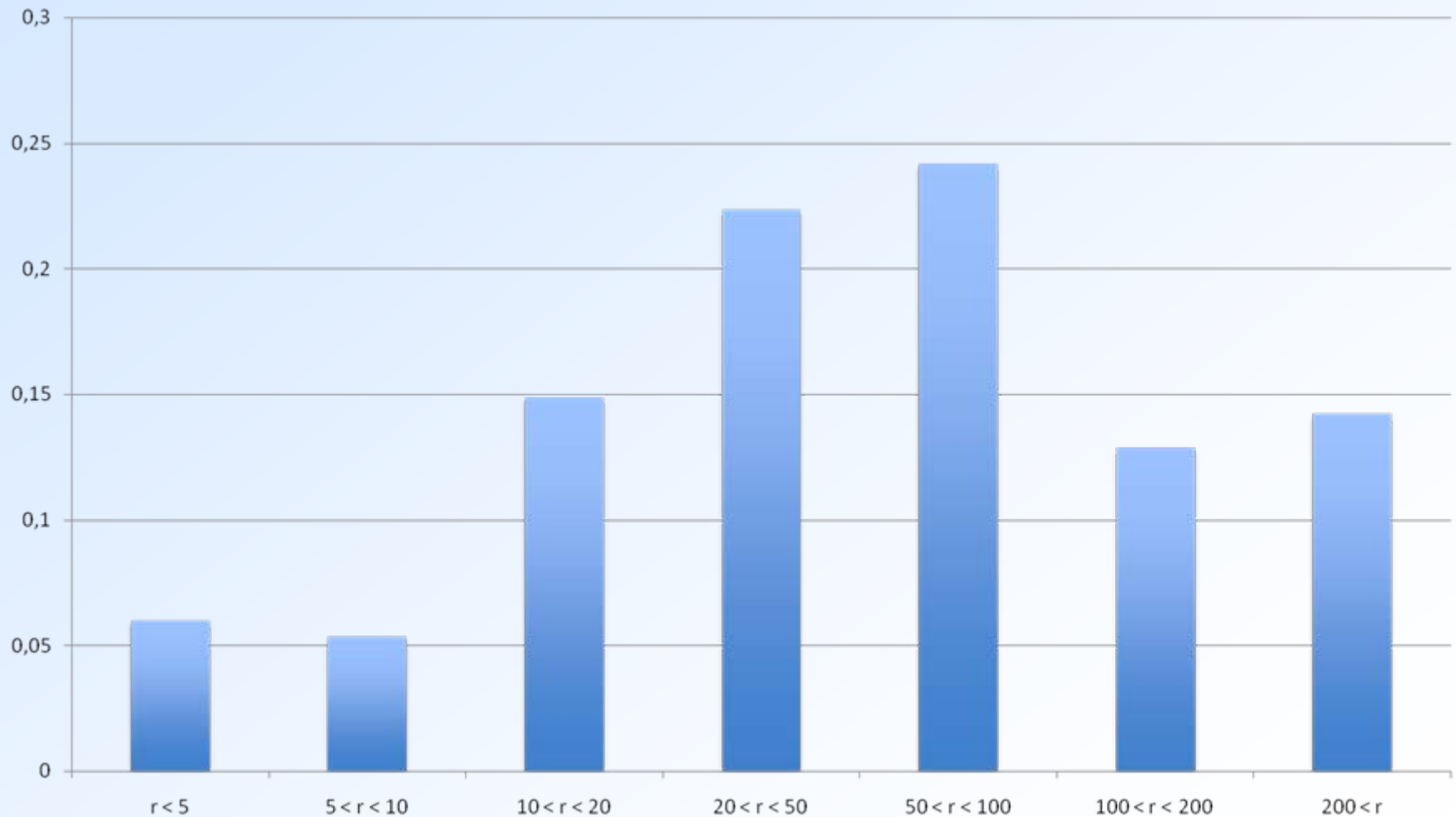
# Time Preferences

TIME OF \$75 EARLIER PAYMENT	ANNUALIZED RATE OF RETURN (%)	LATER PAYMENT AMOUNT	
		ONE MONTH INVESTMENT	ONE YEAR INVESTMENT
TOMORROW	5	75.31	78.75
ONE WEEK	10	75.63	82.50
ONE MONTH	20	76.25	90
3 MONTHS	50	78.13	112.50
	100	81.25	150
	200	87.50	225



# Proportion of Participants Willing to Save

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# Risk Preferences

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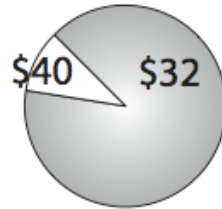
- All Graphical Representations
- Two Basic Measures
  - Holt/Laury
    - 10 binary decisions
  - Eckel Grossman
    - 1 decision chosen from SIX 50/50 gambles
  - (Binary Version of Eckel Grossman)



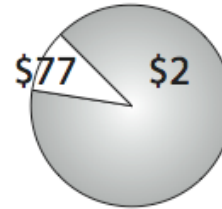


Mark the circle of your  
choice for each pair

Decision  
**49**

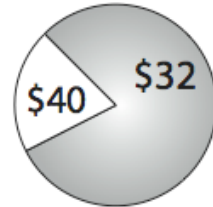


1/10  
**high**

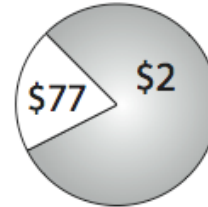


9/10  
**low**

Decision  
**50**

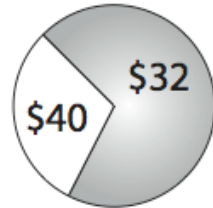


2/10  
**high**



8/10  
**low**

Decision  
**51**

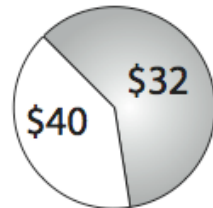


3/10  
**high**

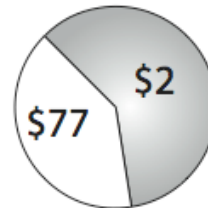


7/10  
**low**

Decision  
**52**



4/10  
**high**



6/10  
**low**

Decision  
**53**



5/10  
**high**

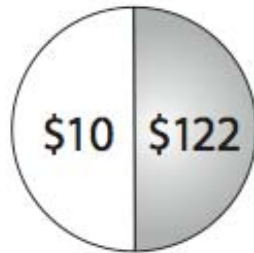


5/10  
**low**

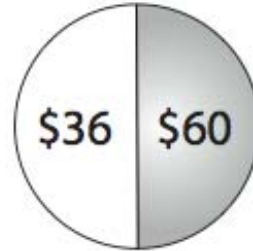


Mark the circle of your choice

Decision  
107



5/10  
low  
5/10  
high



Mark the circle of your  
choice for each pair

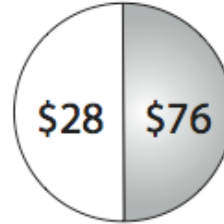
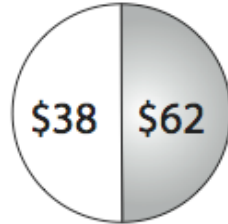
Decision  
**89**



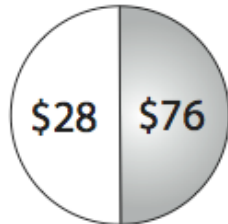
5/10  
**low**  
5/10  
**high**



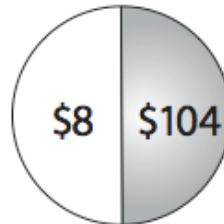
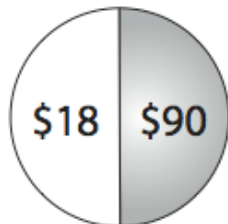
Decision  
**90**



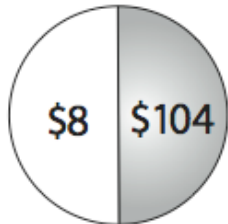
Decision  
**91**



Decision  
**92**



Decision  
**93**



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## Gamble Choice Experiment

Subjects choose which gamble to play

<b>Choice (50/50 Gamble)</b>	<i>Low Payoff</i>	<i>High Payoff</i>	<i>Expected Return</i>	<i>Standard Deviation</i>
Gamble 1	28	28	28	0
Gamble 2	24	36	30	6
Gamble 3	20	44	32	12
Gamble 4	16	52	34	18
Gamble 5	12	60	36	24
Gamble 6	2	70	36	34



# Education Choices

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- Basic Design:
  - cash vs. education financing
- Use these decisions to distinguish pricing from form of financing
- Control for
  - Size of cash alternative
  - Price of subsidy per \$1 education financing
  - Absolute value of education subsidy




# Example of Education Choices

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You must choose A or B:

CHOICE A 

\$\$ one week from today

CHOICE B 

A GRANT for FULL-TIME  
Education or Training

Decision 112  \$300

\$1000 GRANT

Decision 113  \$300

\$4000 GRANT



# Price: Cost per dollar of Subsidy

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- In each decision, participants have to give up a certain amount of cash
- If they choose a \$1,000 Grant rather than a \$25 cash alternative, their cost would be \$25 cost/\$1,000 subsidy or 2.5 cents per dollar of subsidy



# Price: Cost per dollar of Subsidy

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- If they choose a \$1,000 **Loan** rather than \$300 cash alternative,
- The cost of the subsidy would roughly include
  - \$300 they gave up to get the loan
  - payback at end of ~5 ½ years
  - subsidized interest for ~5 ½ years





# Price: Cost per dollar of Subsidy

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In other words:

Cost/\$Subsidy

= [Cash alternative + PV loan – PV  
subsidized interest] / Subsidy amount



# Education Choices

Decision Number	Type of Subsidy	Maximum Subsidy Amt.	Cash Alternative	Cost per \$ Edu Subsidy	Proportion take-up
109	Loan	\$2000	\$25	0.629	
110	Loan	\$2000	\$300	0.772	
111	Loan	\$2000	\$700	0.972	
112	Loan	\$1000	\$300	0.917	
110*	Loan	\$2000	\$300	0.772	
113	Loan	\$4000	\$300	0.692	
114	Hybrid	\$2000	\$25	0.321	
115	Hybrid	\$2000	\$300	0.458	
116	Hybrid	\$2000	\$700	0.658	
117	Hybrid	\$1000	\$300	0.611	
115*	Hybrid	\$2000	\$300	0.458	
118	Hybrid	\$4000	\$300	0.383	



# Education Choices

Decision Number	Type of Subsidy	Maximum Subsidy Amt.	Cash Alternative	Cost per \$ Edu Subsidy	Proportion take-up
109	Loan	\$2000	\$25	0.629	
110	Loan	\$2000	\$300	0.772	
111	Loan	\$2000	\$700	0.972	
112	Loan	\$1000	\$300	0.917	
110*	Loan	\$2000	\$300	0.772	
113	Loan	\$4000	\$300	0.692	
114	Hybrid	\$2000	\$25	0.321	
115	Hybrid	\$2000	\$300	0.458	
116	Hybrid	\$2000	\$700	0.658	
117	Hybrid	\$1000	\$300	0.611	
115*	Hybrid	\$2000	\$300	0.458	
118	Hybrid	\$4000	\$300	0.383	



# Education Choices

Decision Number	Type of Subsidy	Maximum Subsidy Amt	Cash Alternative	Cost per \$ Edu Subsidy	Proportion take-up
119	ICR Hybrid	\$2000	\$25	0.321	
120	ICR Hybrid	\$2000	\$300	0.458	
121	ICR Hybrid	\$2000	\$700	0.658	
122	ICR Hybrid	\$1000	\$300	0.611	
120*	ICR Hybrid	\$2000	\$300	0.458	
123	ICR Hybrid	\$4000	\$300	0.383	
124	Grant	\$1000	\$25	0.025	
125	Grant	\$1000	\$100	0.100	
126	Grant	\$1000	\$300	0.300	
127	Grant	\$1000	\$700	0.700	
128	Grant	\$500	\$300	0.600	
126*	Grant	\$1000	\$300	0.300	
129	Grant	\$2000	\$300	0.150	
130	Grant	\$4000	\$300	0.075	



# Education Choices

Decision Number	Type of Subsidy	Maximum Subsidy Amt.	Cash Alternative	Cost per \$ Edu Subsidy	Proportion take-up
109	Loan	\$2000	\$25	0.629	0.458
110	Loan	\$2000	\$300	0.772	0.172
111	Loan	\$2000	\$700	0.972	0.051
112	Loan	\$1000	\$300	0.917	0.110
110*	Loan	\$2000	\$300	0.772	0.172
113	Loan	\$4000	\$300	0.692	0.284
114	Hybrid	\$2000	\$25	0.321	0.834
115	Hybrid	\$2000	\$300	0.458	0.637
116	Hybrid	\$2000	\$700	0.658	0.390
117	Hybrid	\$1000	\$300	0.611	0.288
115*	Hybrid	\$2000	\$300	0.458	0.637
118	Hybrid	\$4000	\$300	0.383	0.728

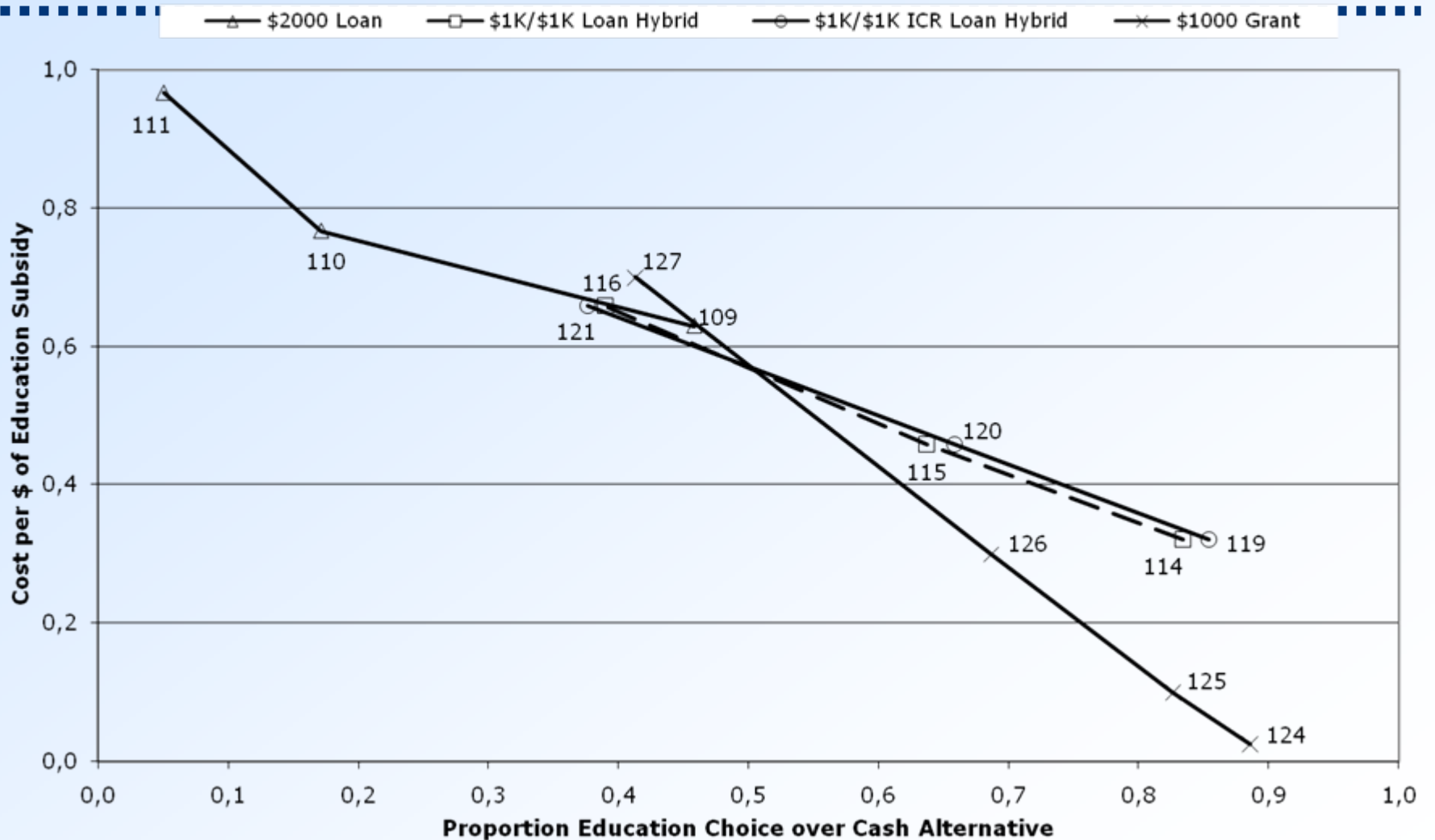


# Education Choices

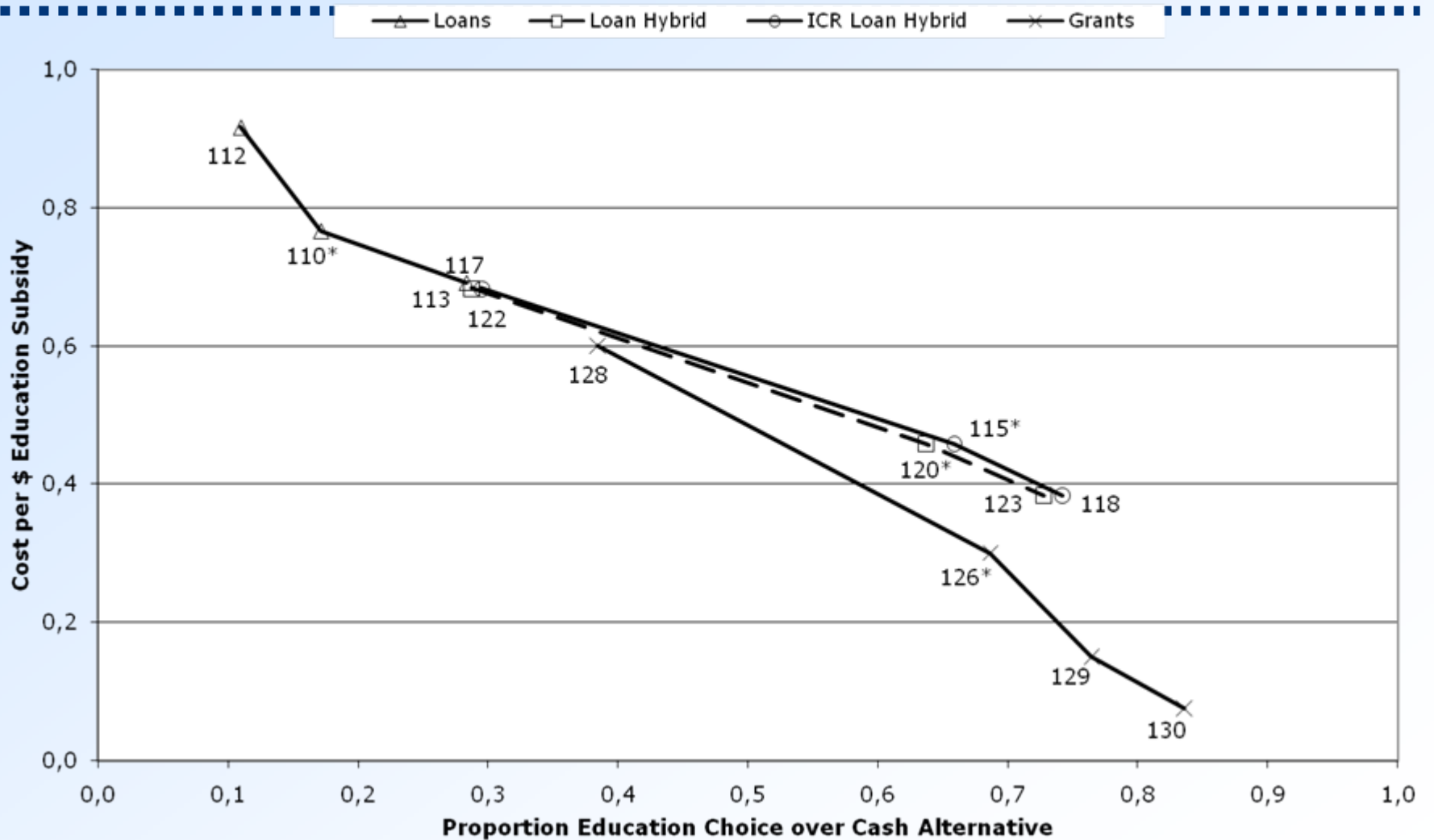
Decision Number	Type of Subsidy	Maximum Subsidy Amt	Cash Alternative	Cost per \$ Edu Subsidy	Proportion take-up
119	ICR Hybrid	\$2000	\$25	0.321	0.854
120	ICR Hybrid	\$2000	\$300	0.458	0.659
121	ICR Hybrid	\$2000	\$700	0.658	0.377
122	ICR Hybrid	\$1000	\$300	0.611	0.295
120*	ICR Hybrid	\$2000	\$300	0.458	0.659
123	ICR Hybrid	\$4000	\$300	0.383	0.742
124	Grant	\$1000	\$25	0.025	0.886
125	Grant	\$1000	\$100	0.100	0.823
126	Grant	\$1000	\$300	0.300	0.687
127	Grant	\$1000	\$700	0.700	0.413
128	Grant	\$500	\$300	0.600	0.385
126*	Grant	\$1000	\$300	0.300	0.687
129	Grant	\$2000	\$300	0.150	0.764
130	Grant	\$4000	\$300	0.075	0.836



## Education Choice per Price of Subsidy Constant Subsidy, Varying Cash Alternative (\$25-\$700), Decision No.

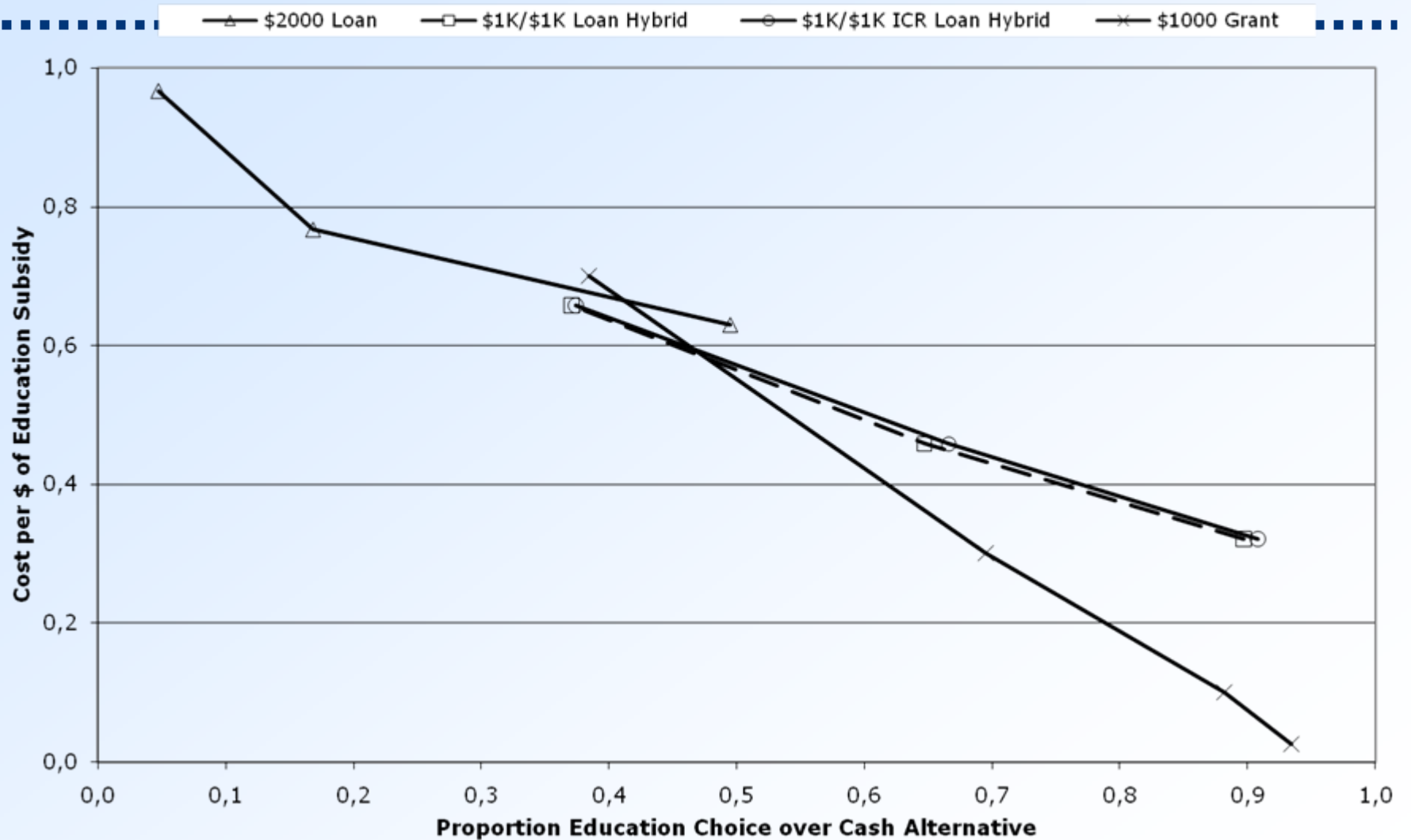


### Education Choice per Price of Subsidy \$300 Cash Alternative, Varying Subsidy (\$500-\$4000), Decision No.\*

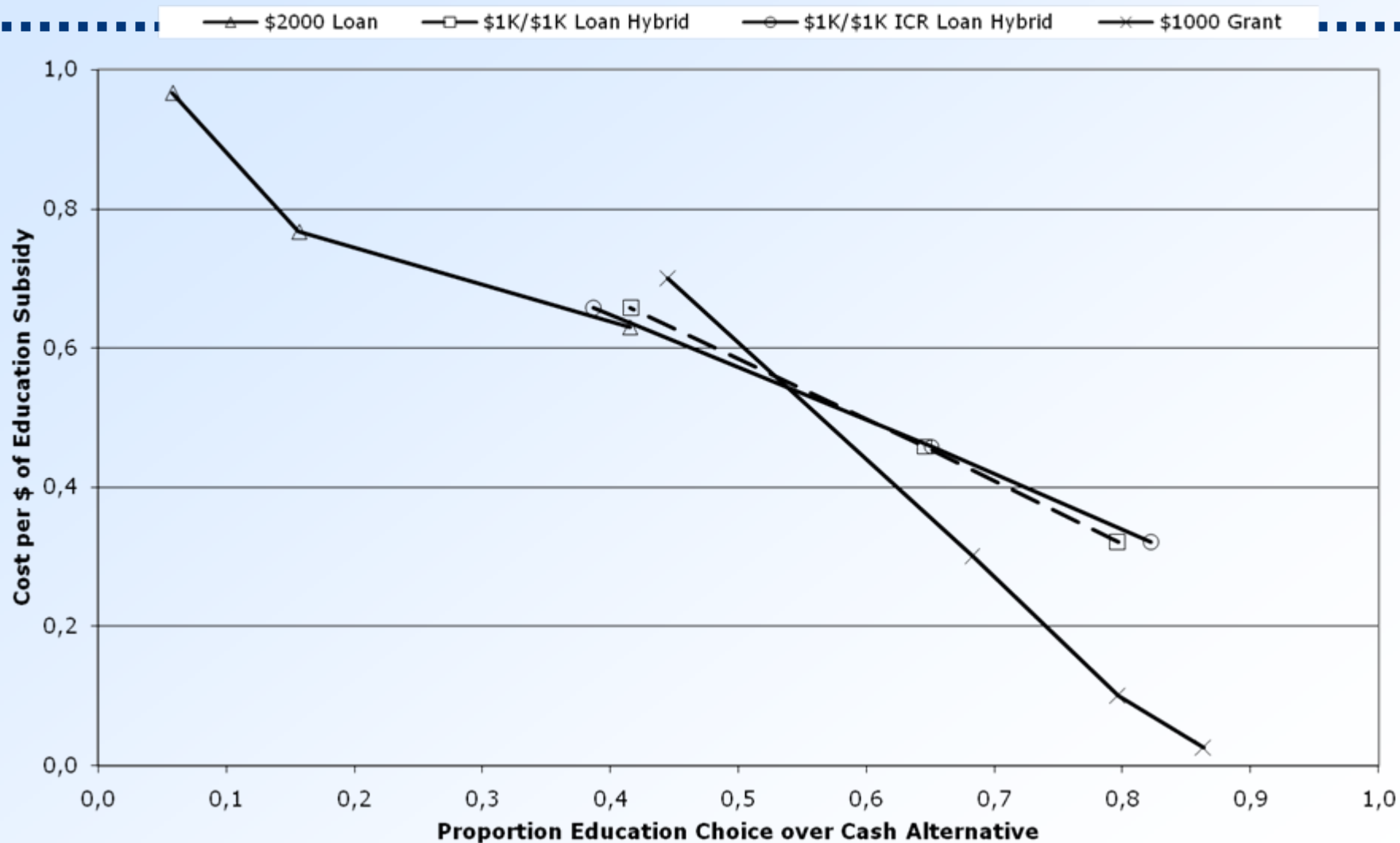




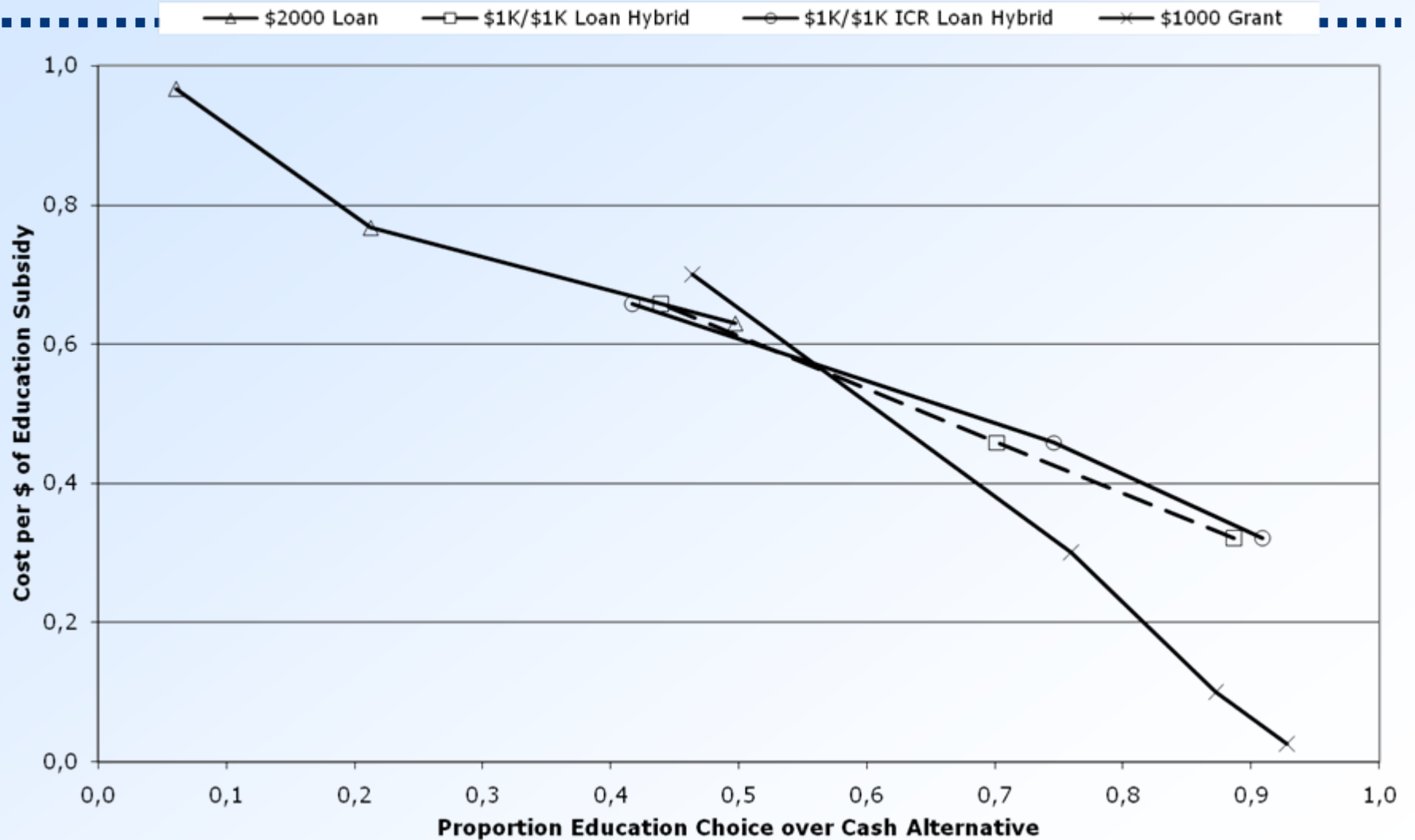
# Quebec



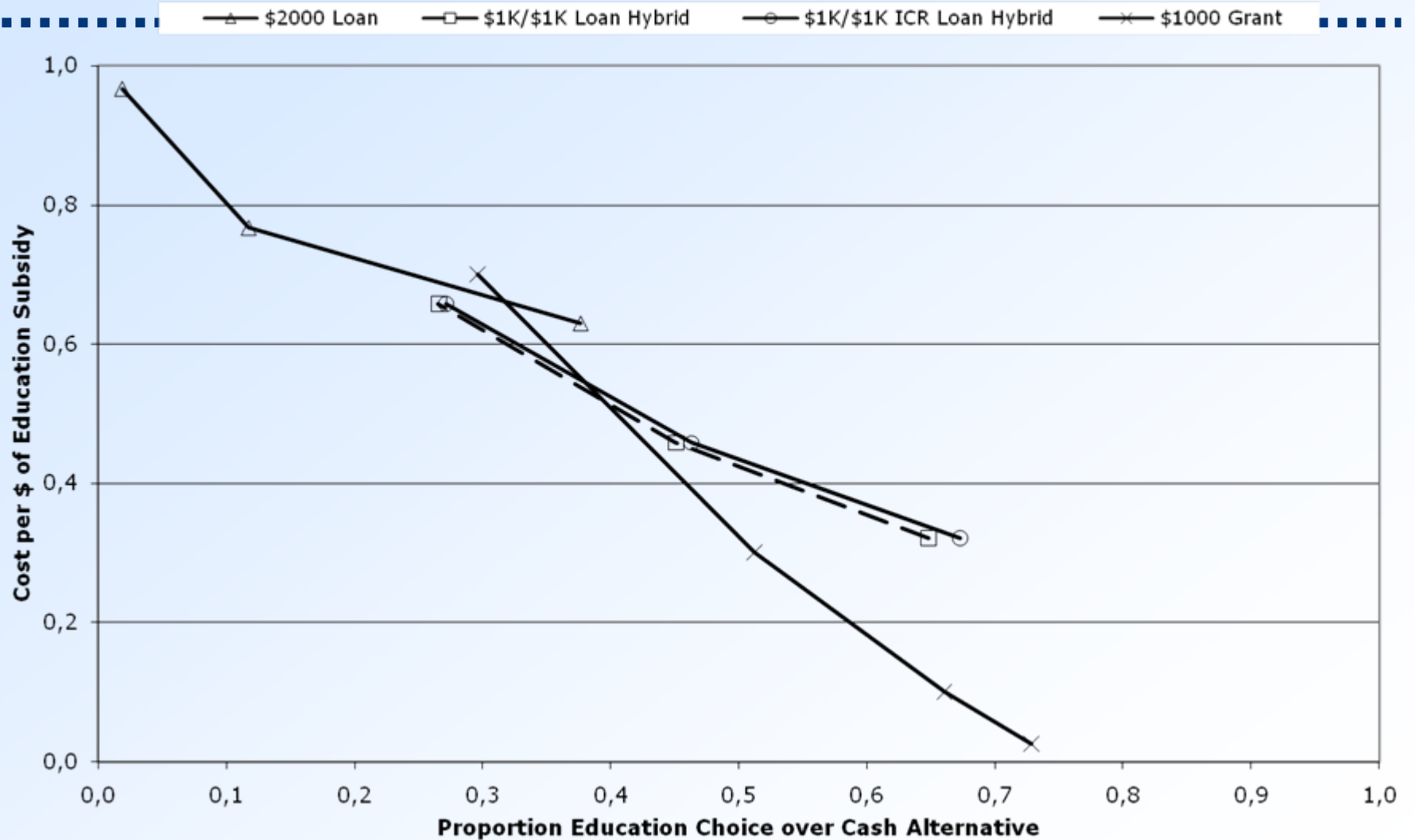
# Manitoba



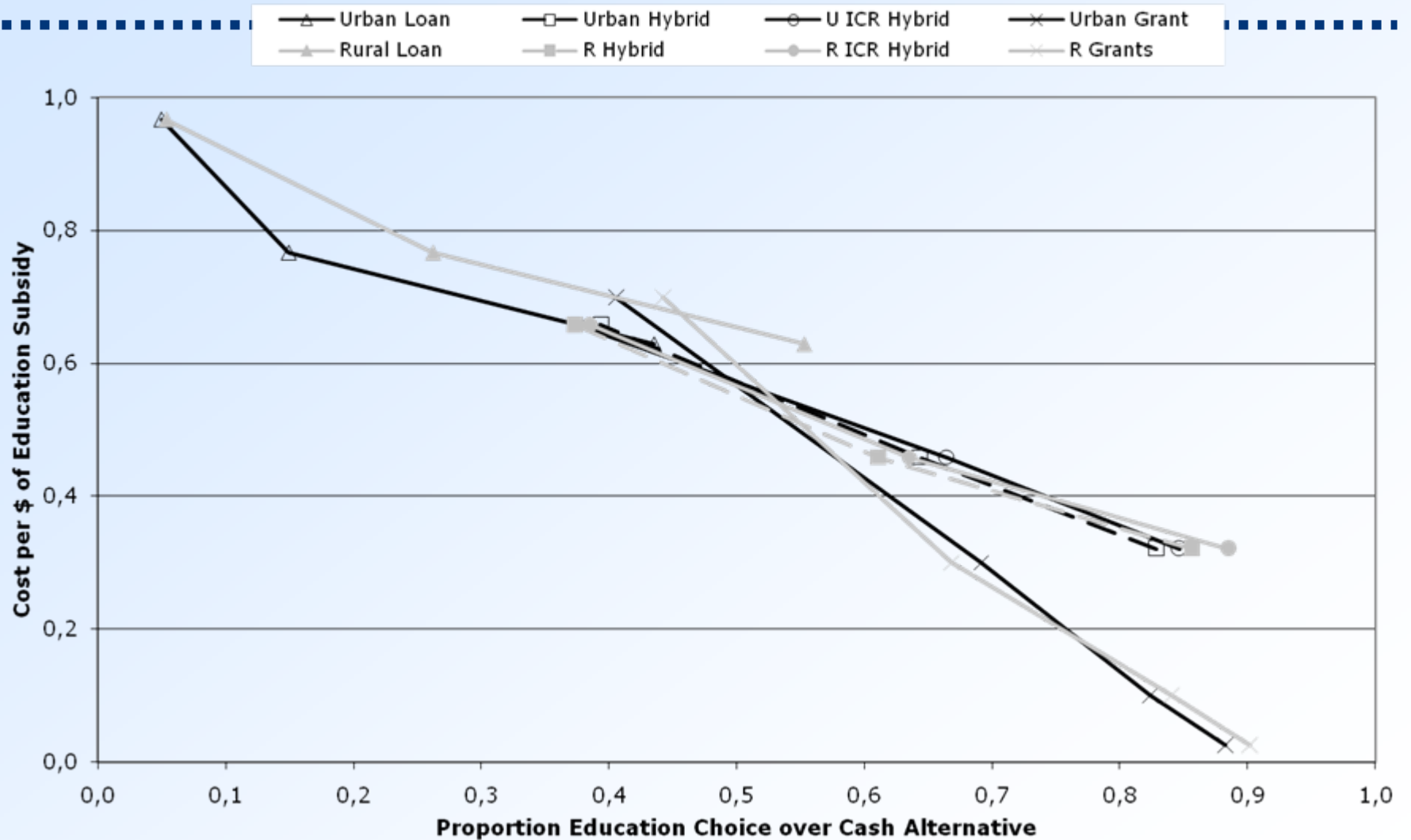
# Ontario



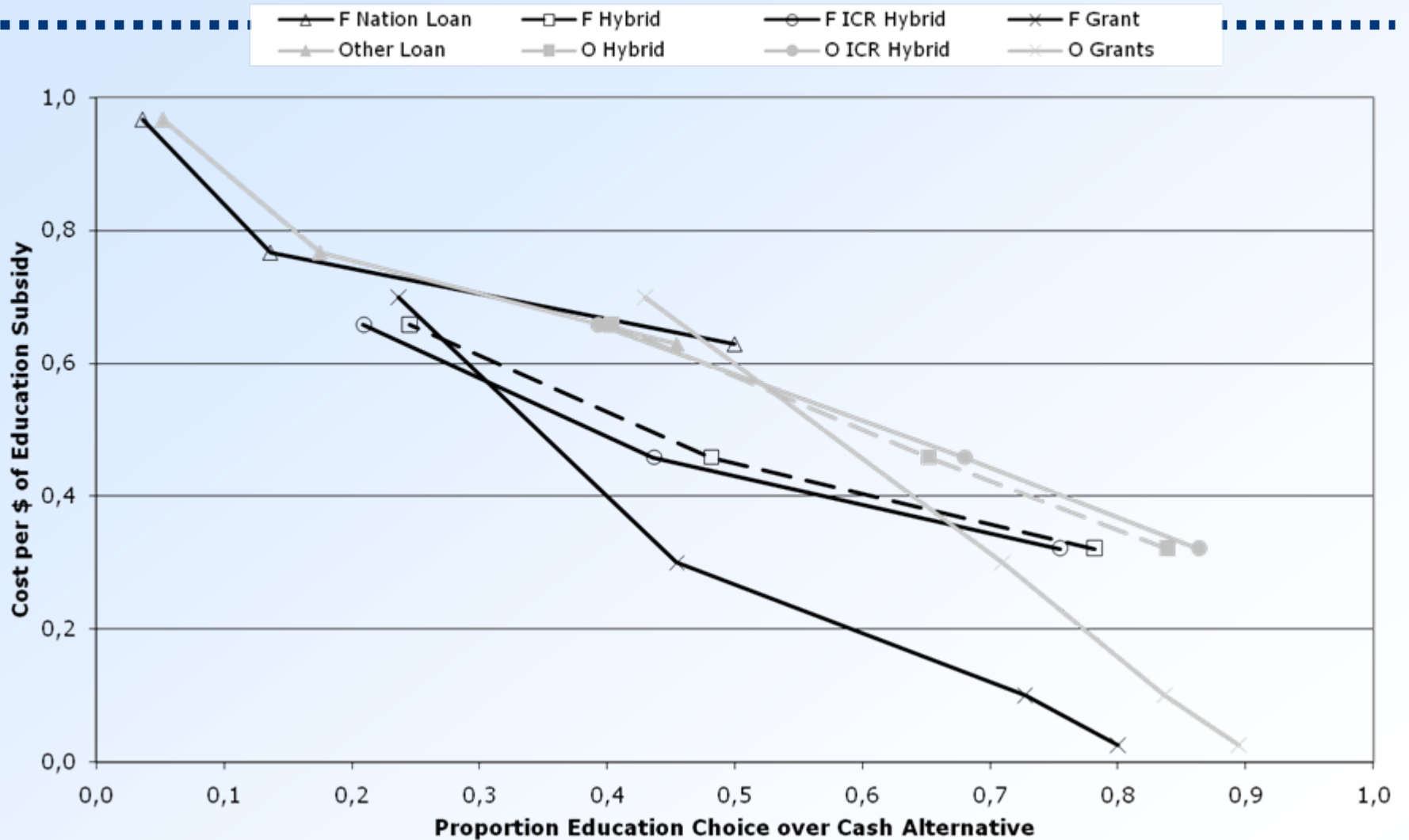
# Saskatchewan



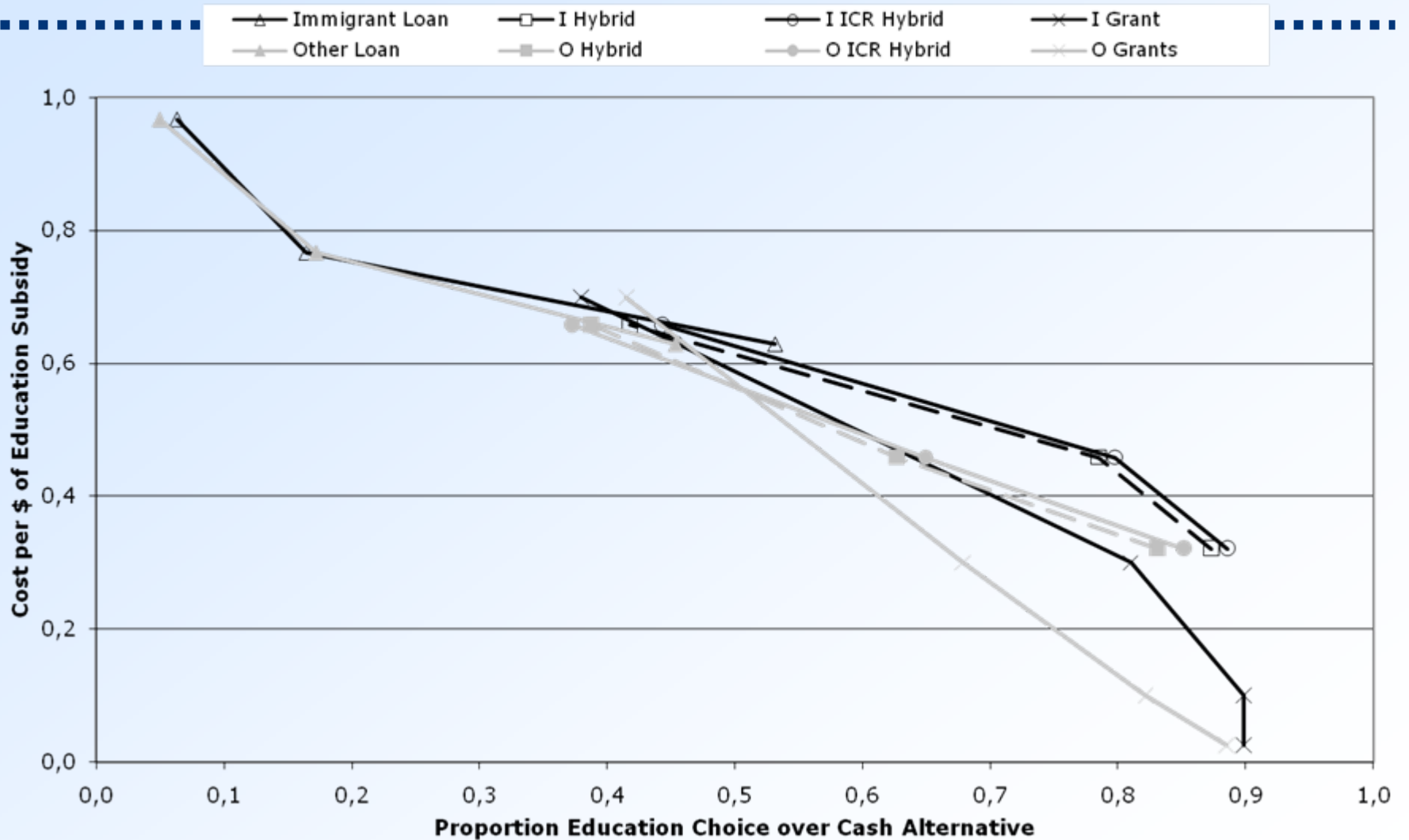
# Urban/Rural



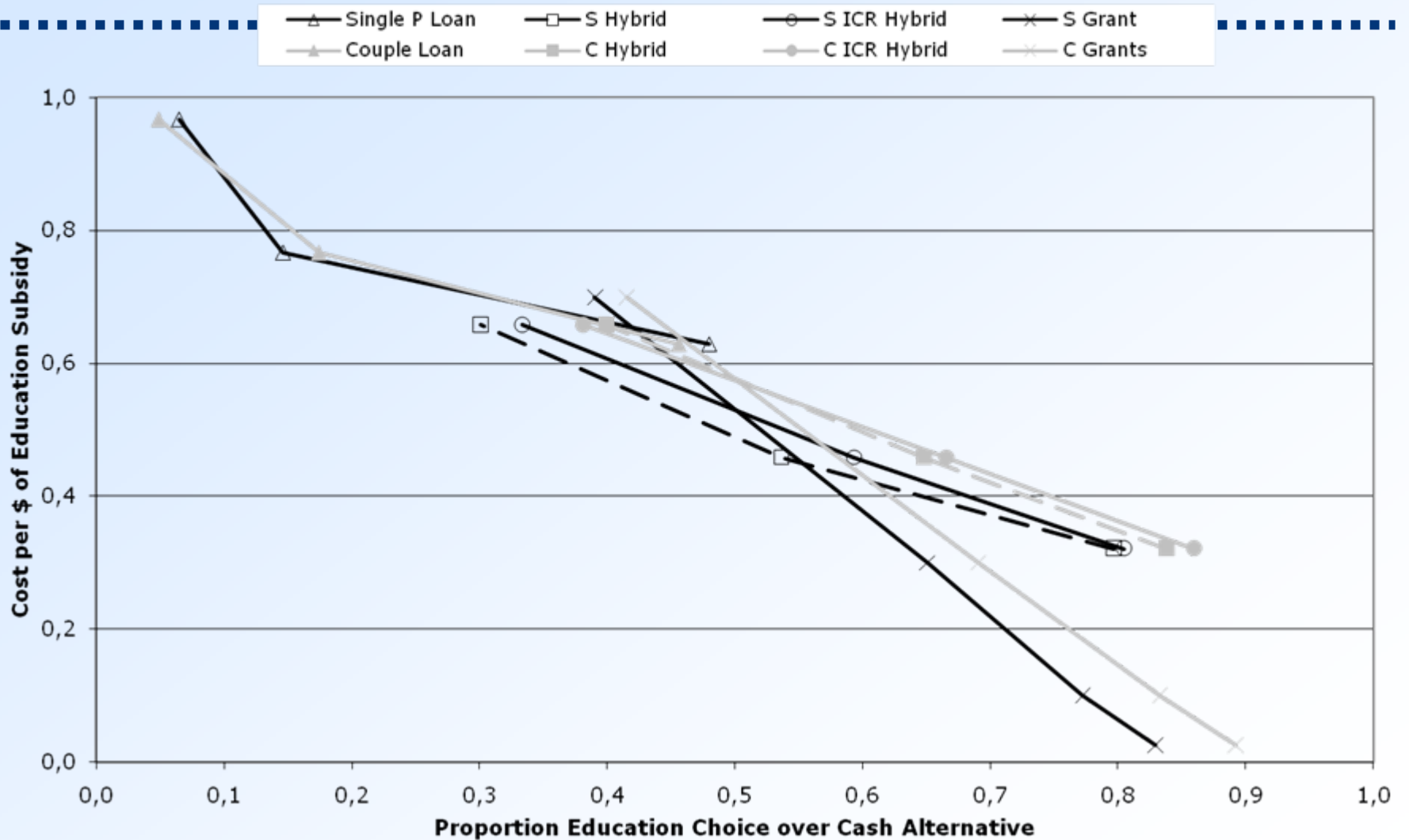
# First Nation



# Immigrant

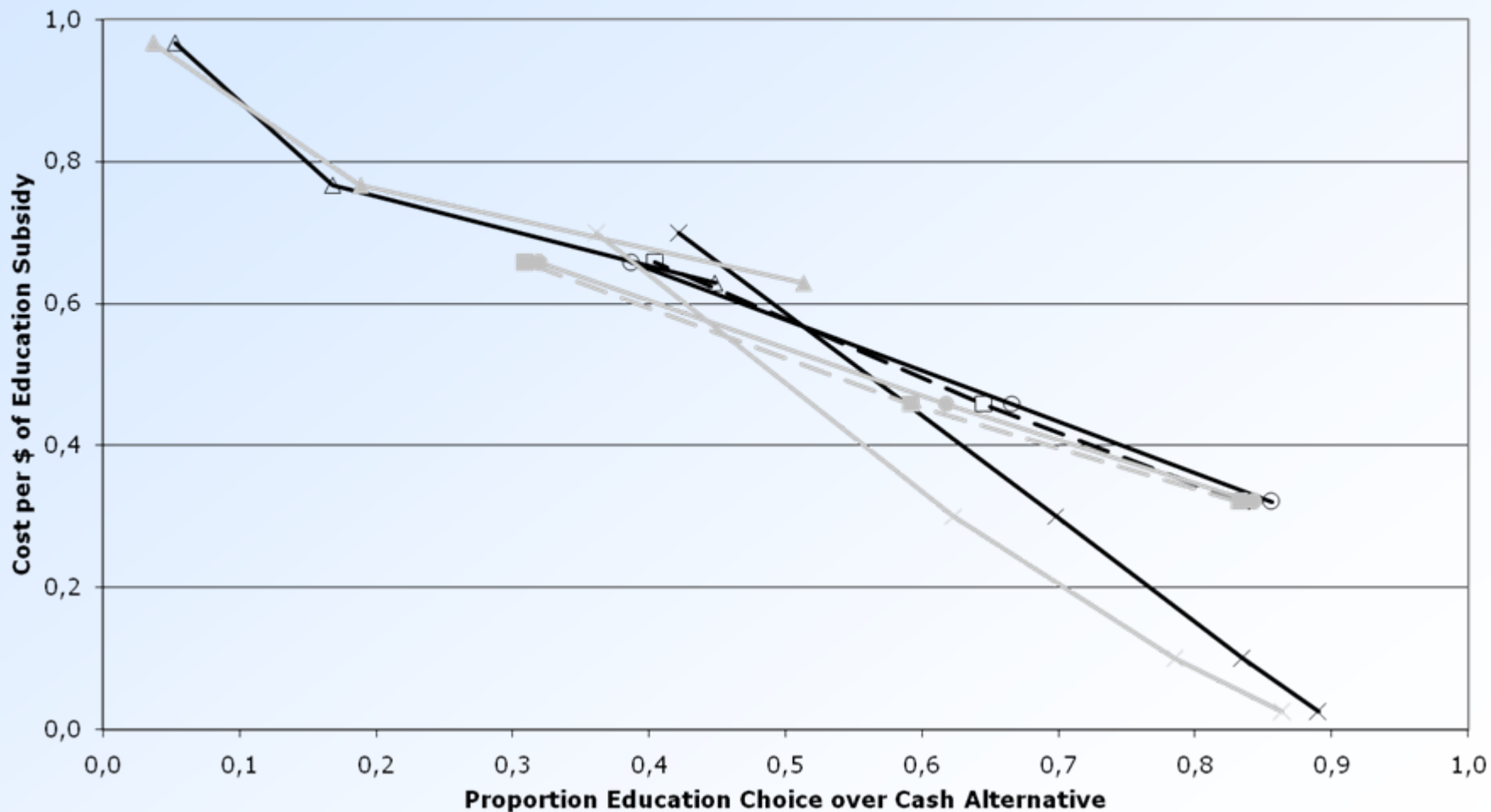


# Single Parent

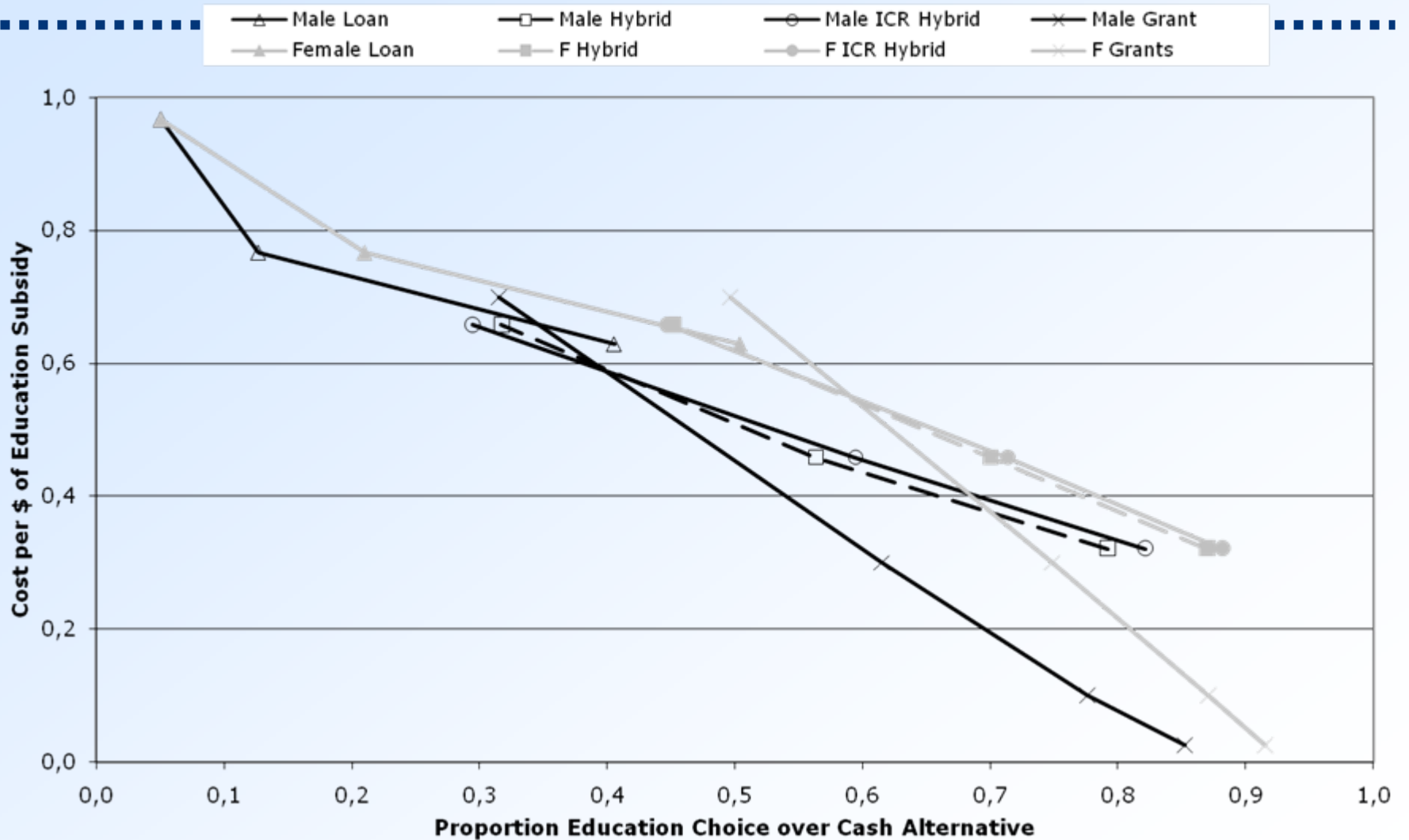




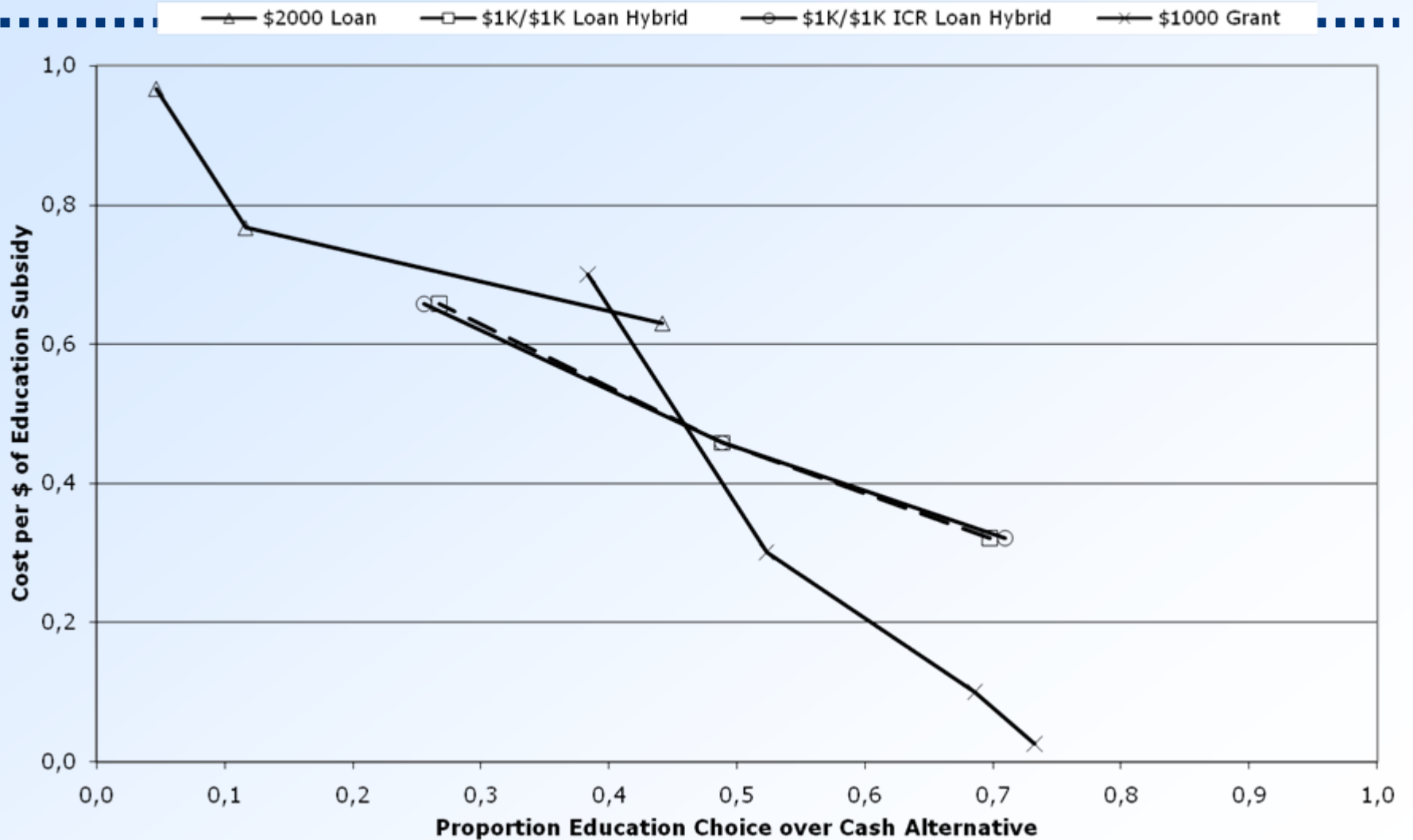
# Income



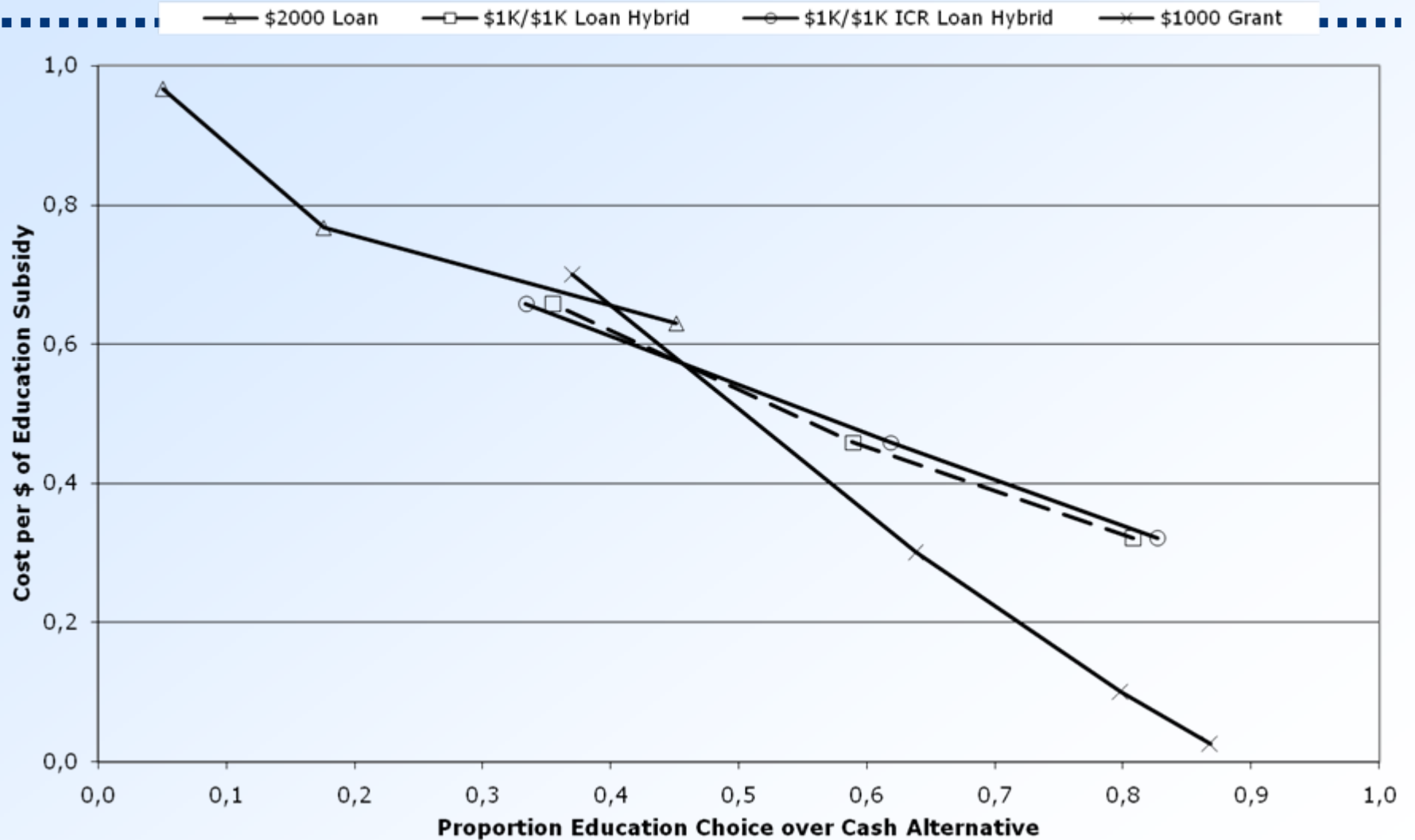
# Male/Female



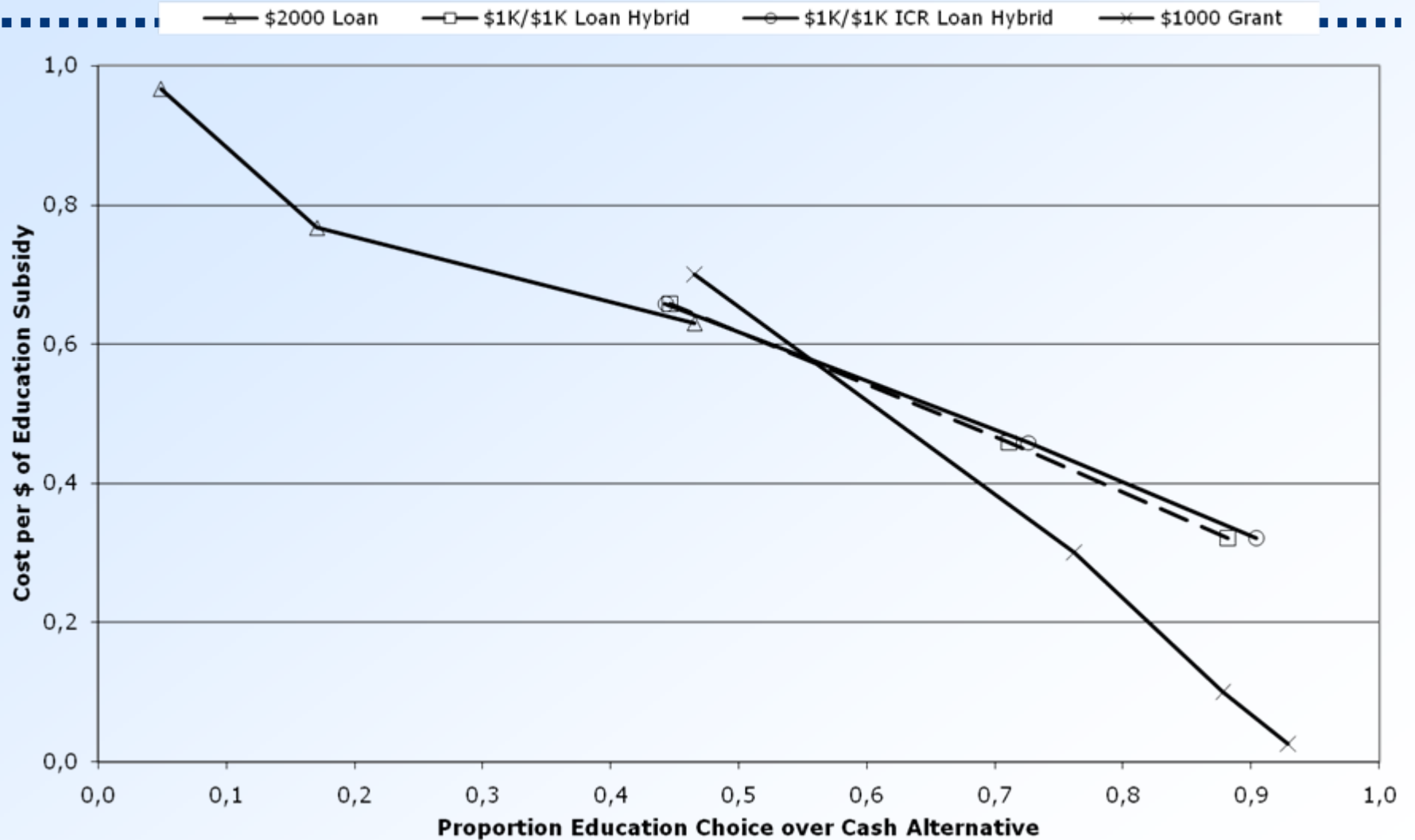
# Low Numeracy, 0-200



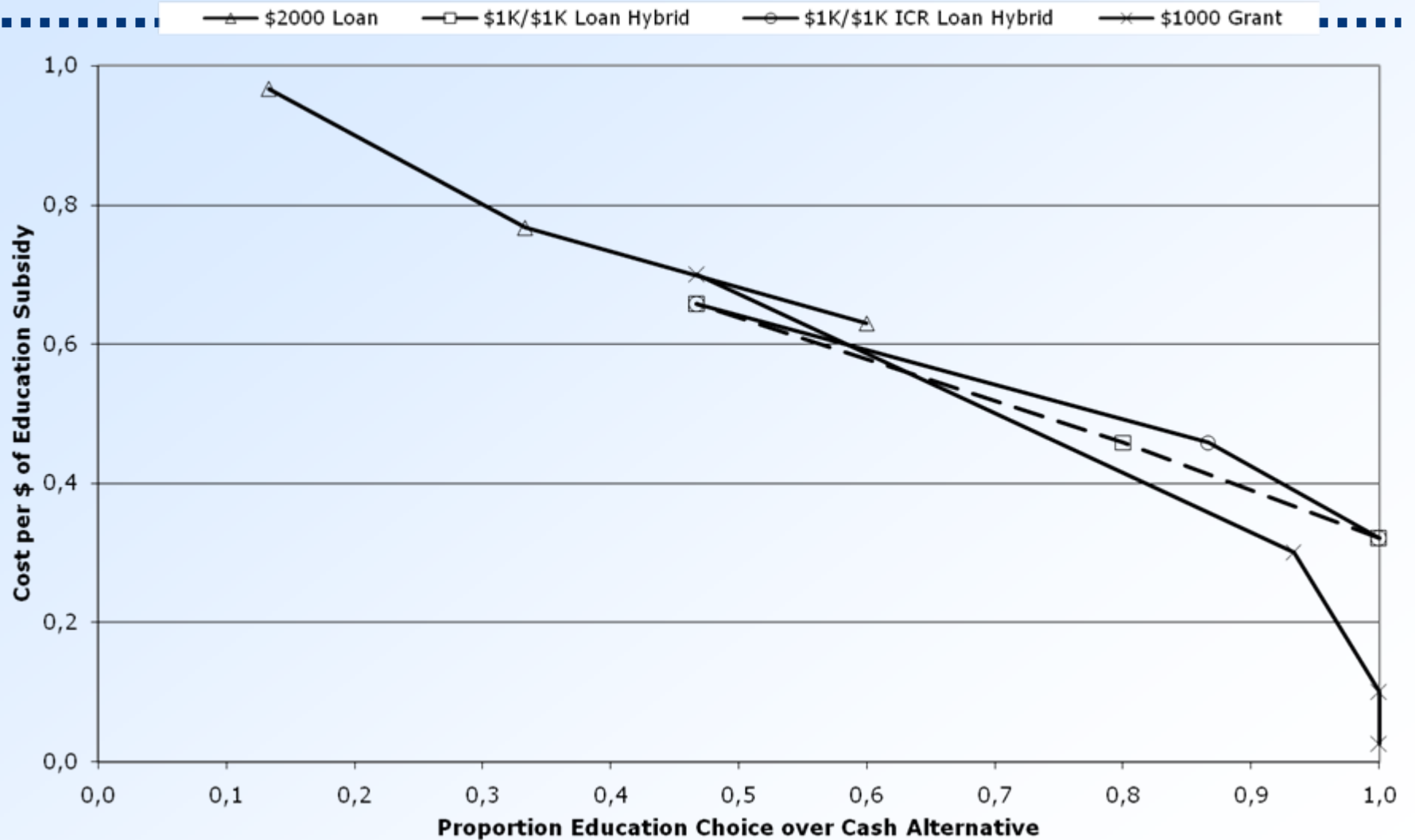
# Medium Numeracy, 200-300



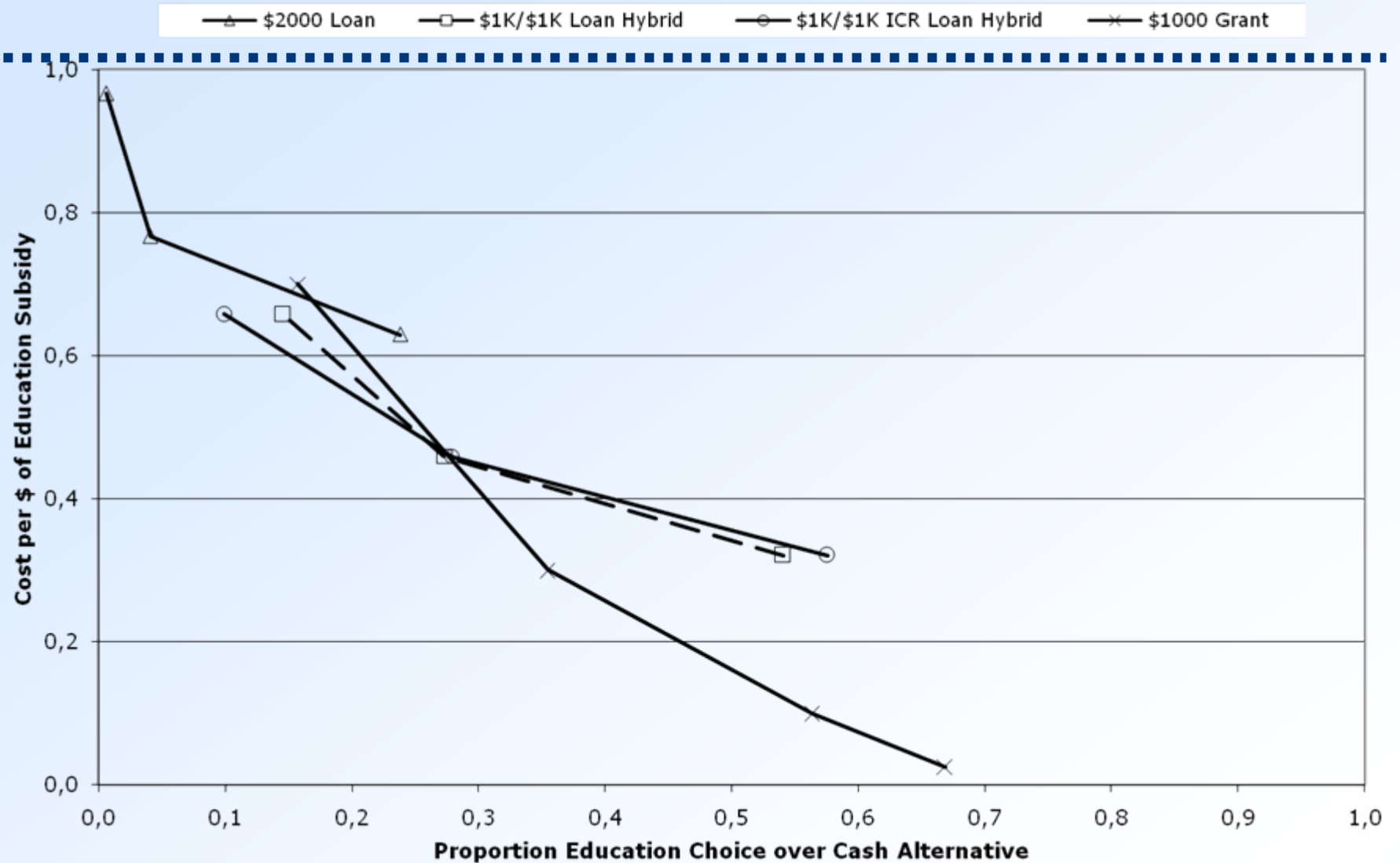
# Medium High Numeracy, 300-400



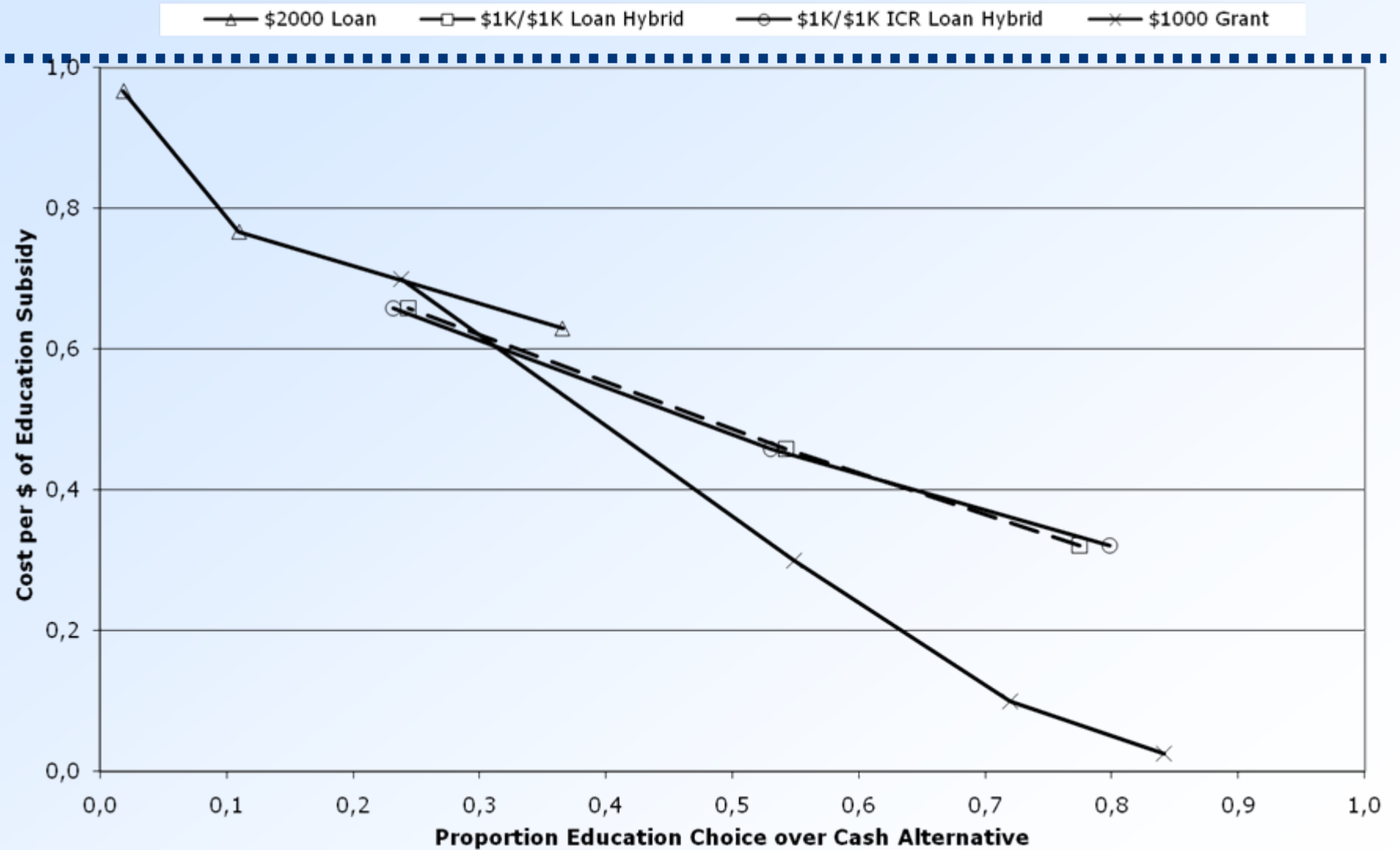
# High Numeracy, 400-500



# Time Preference $r > 200$

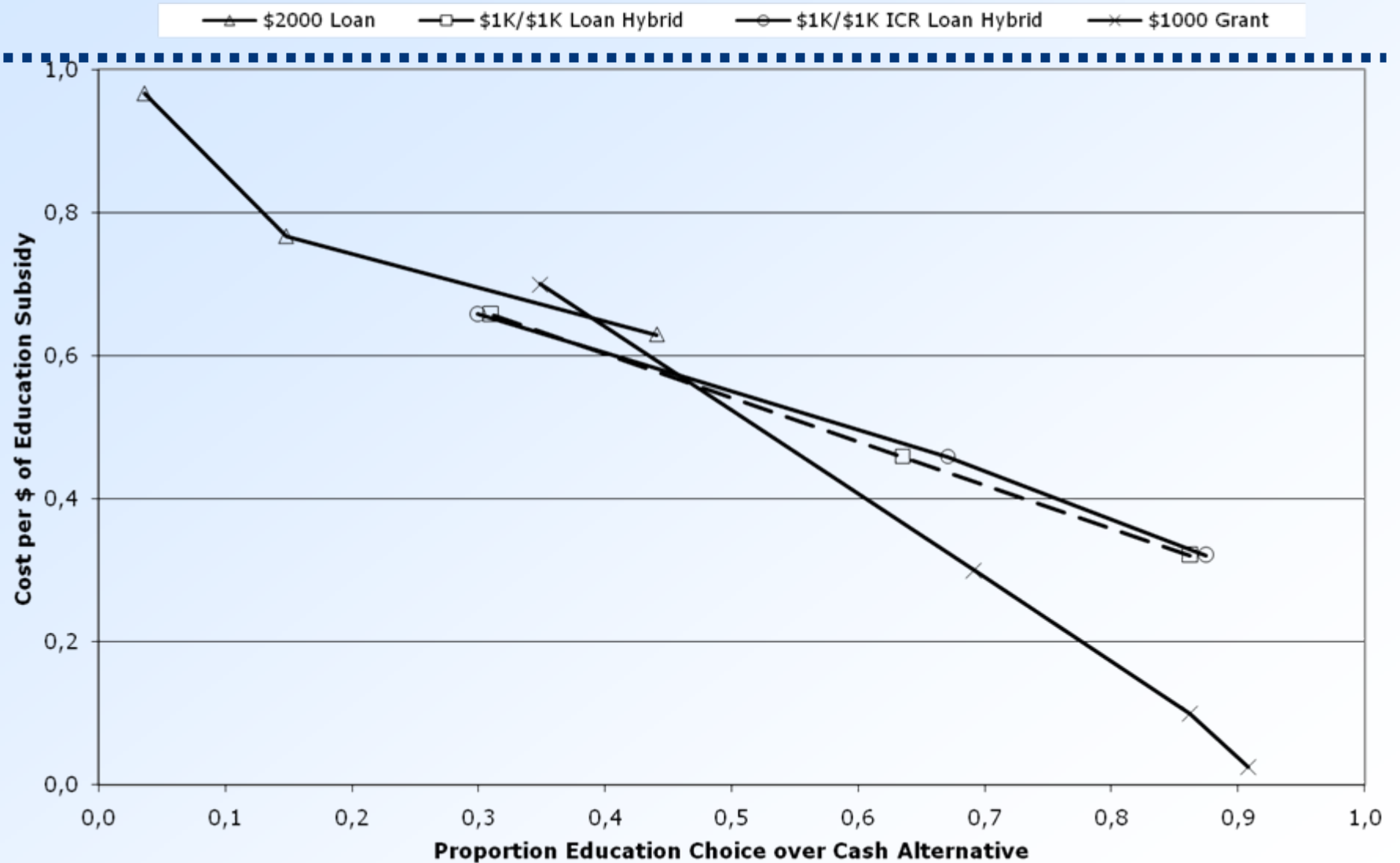


# Time Preference $100 < r < 200$



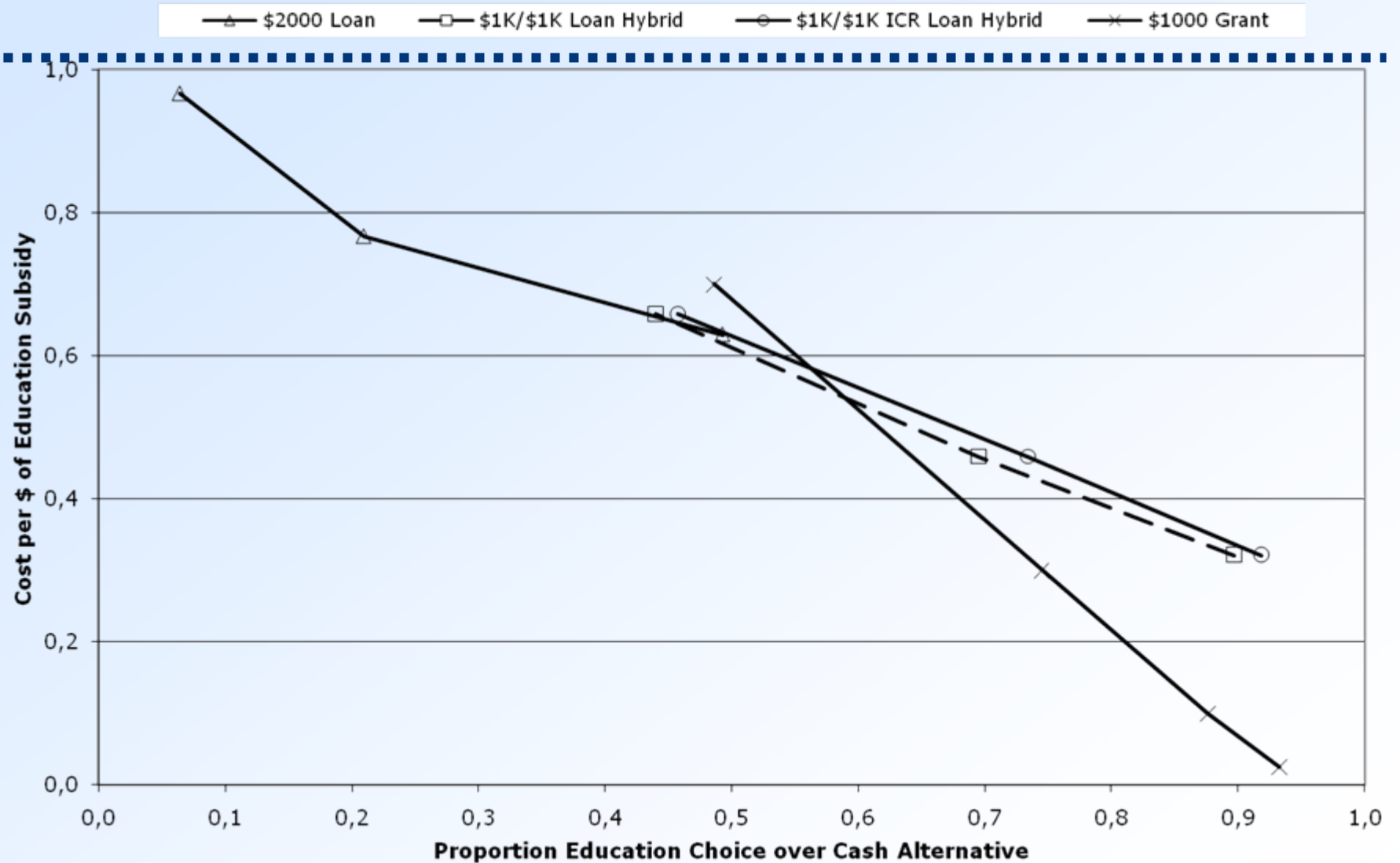


# Time Preference $50 < r < 100$

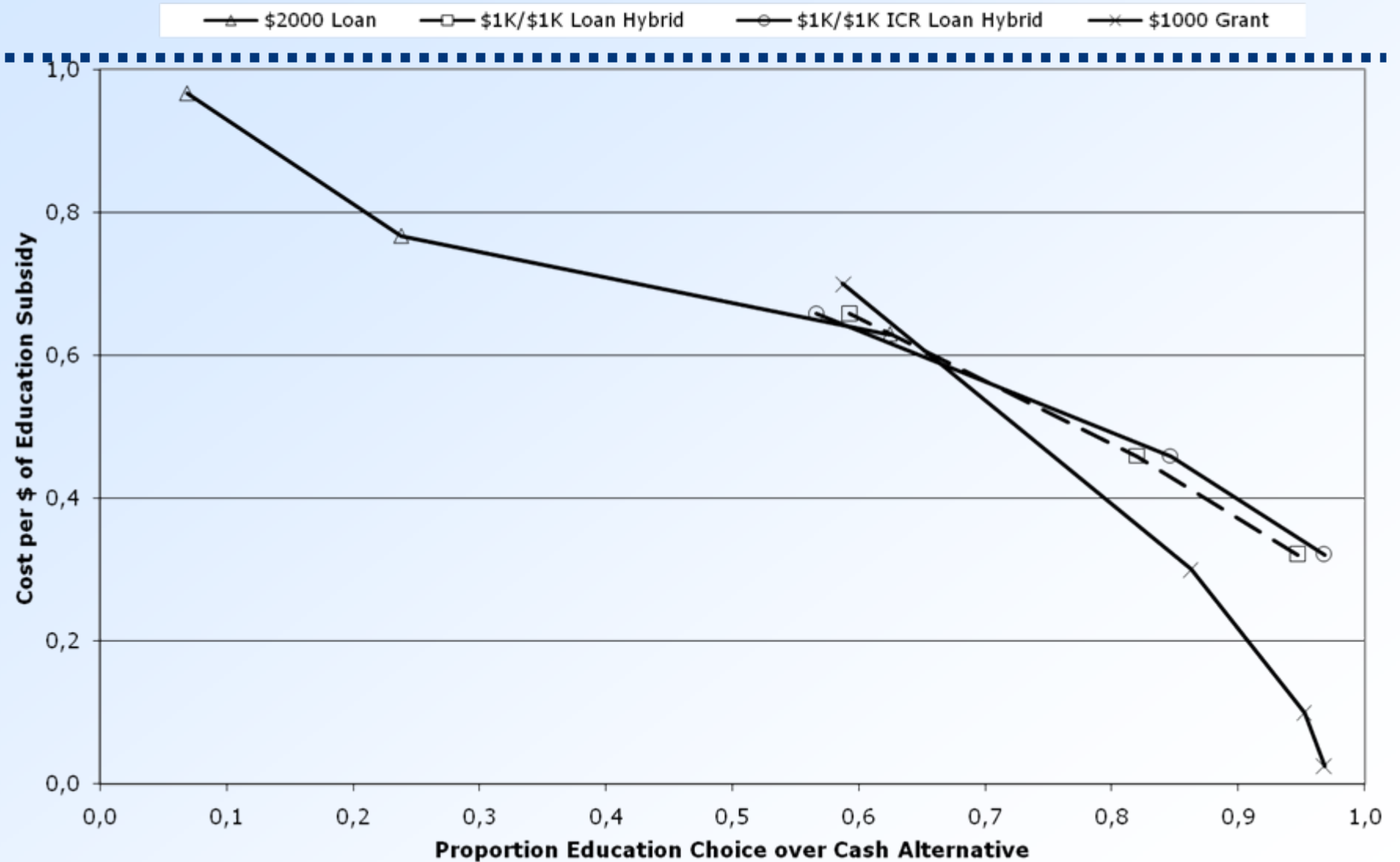


# Time Preference

## $20 < r < 50$

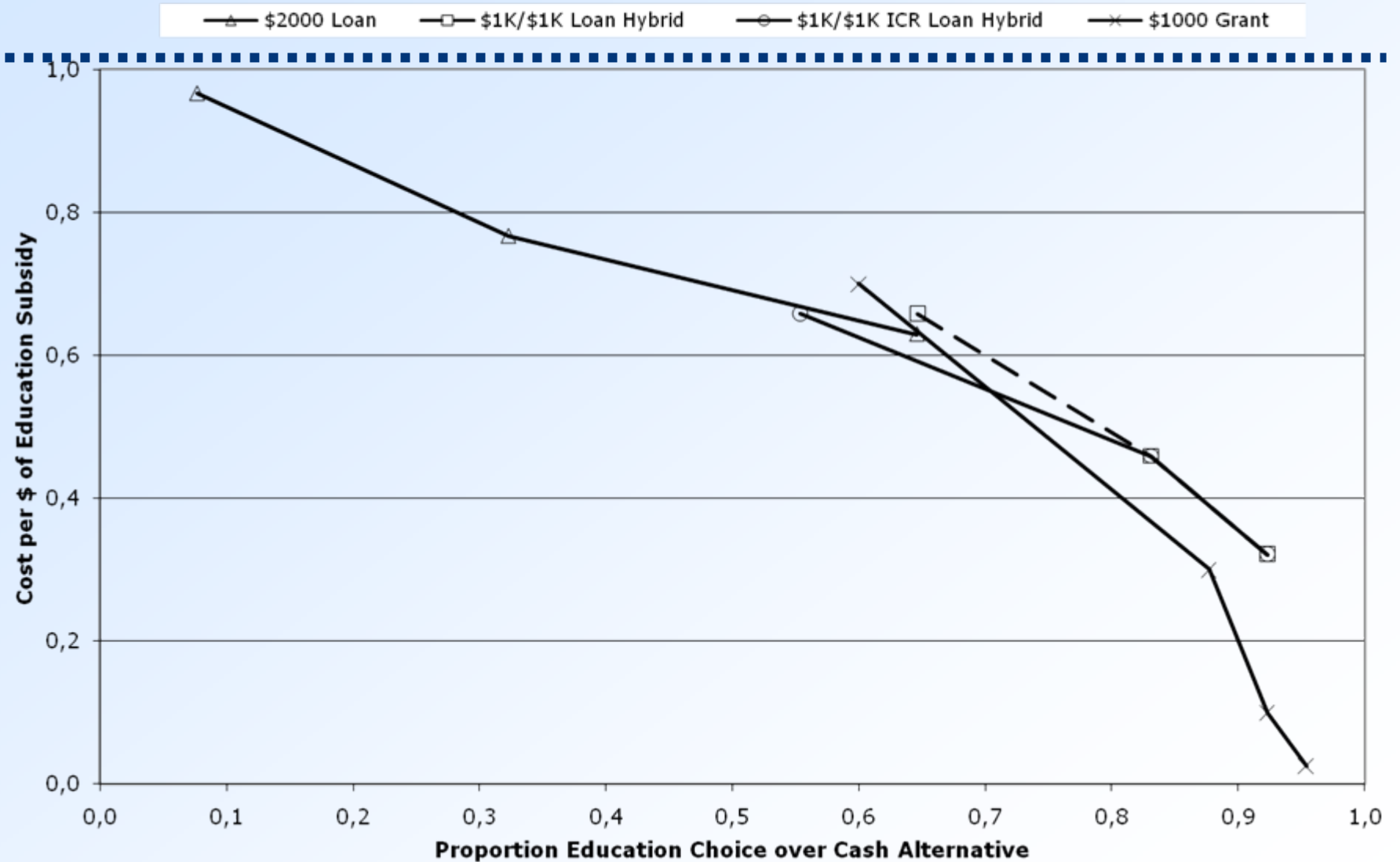


# Time Preference $10 < r < 20$

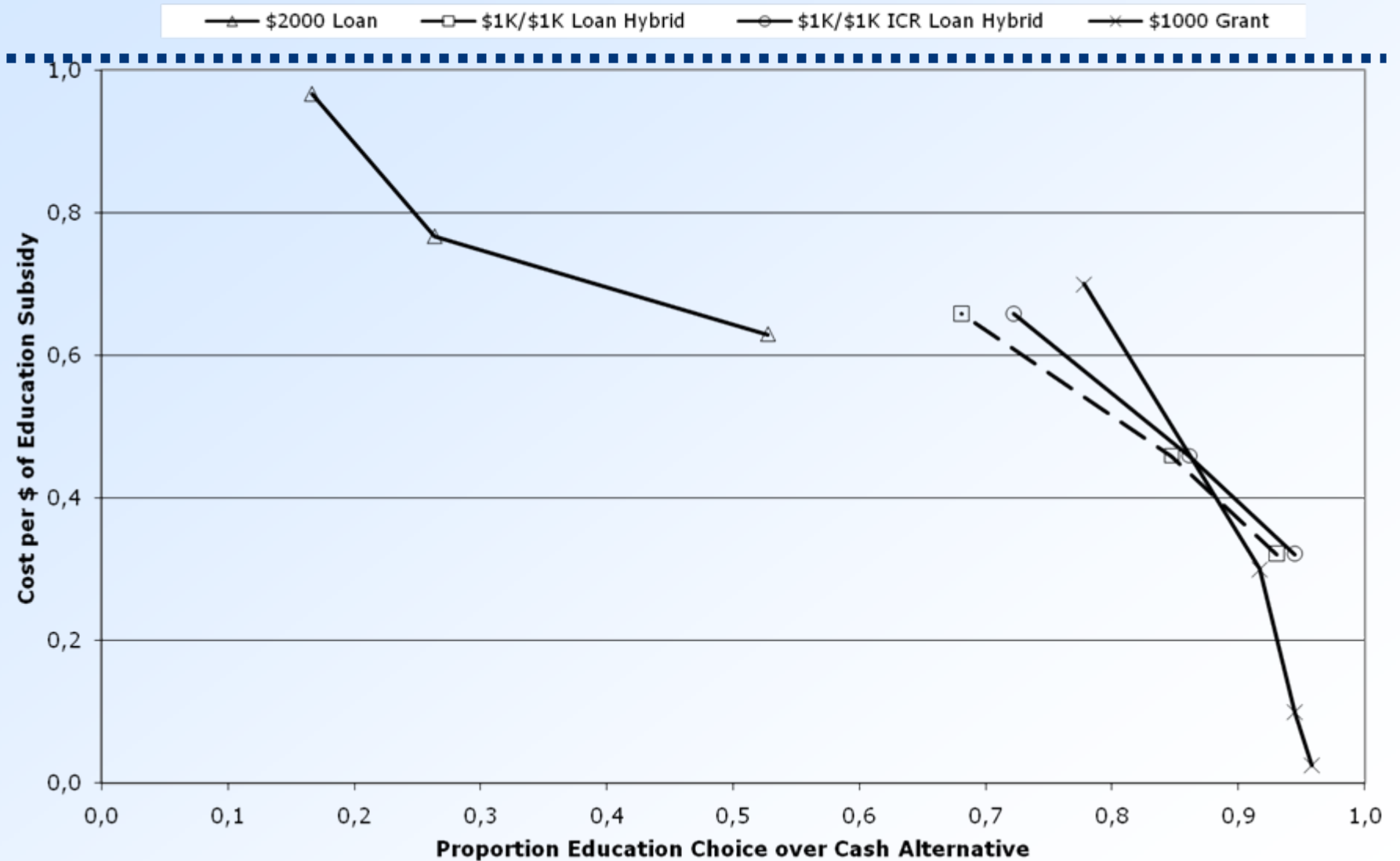


# Time Preference

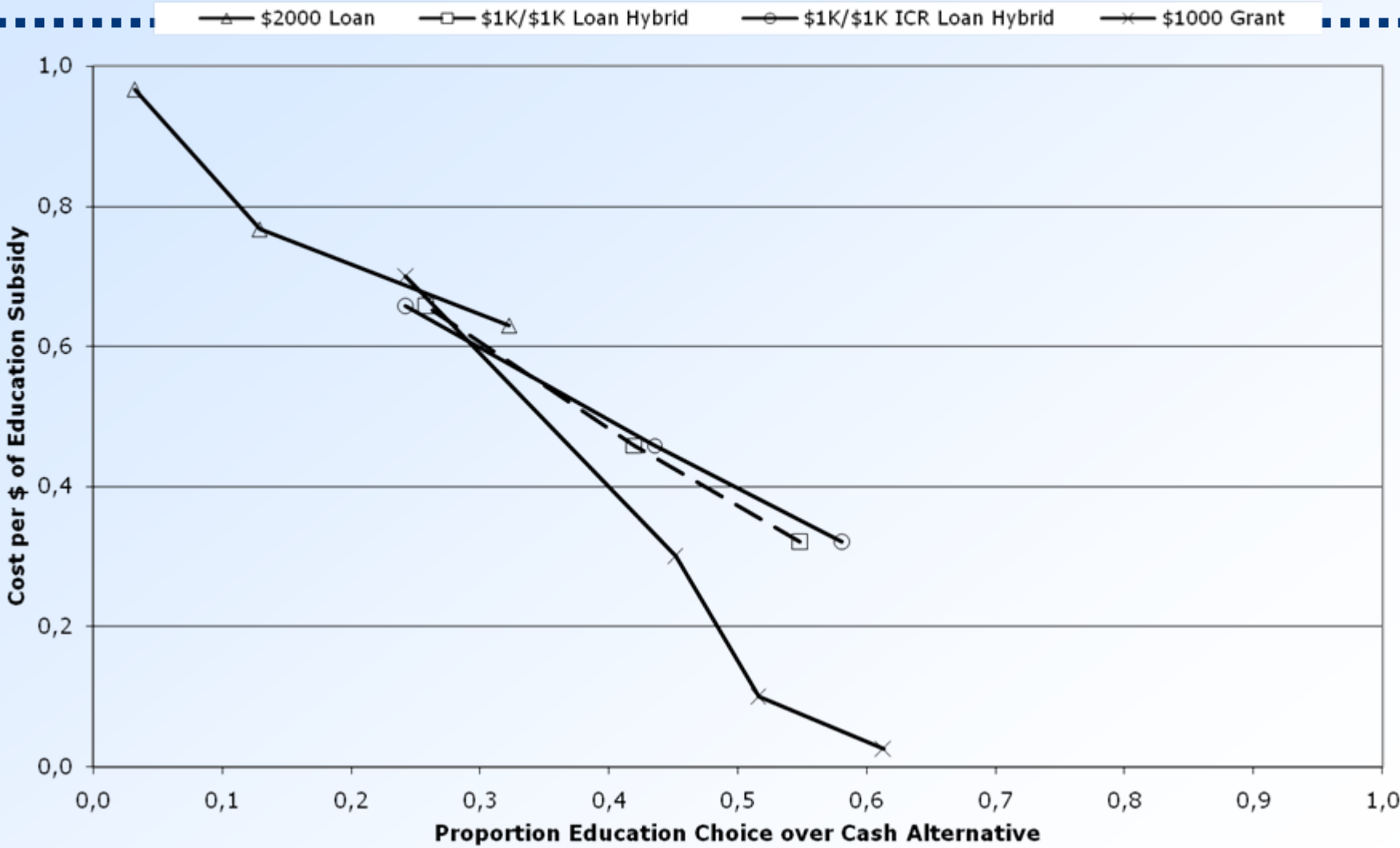
## $5 < r < 10$



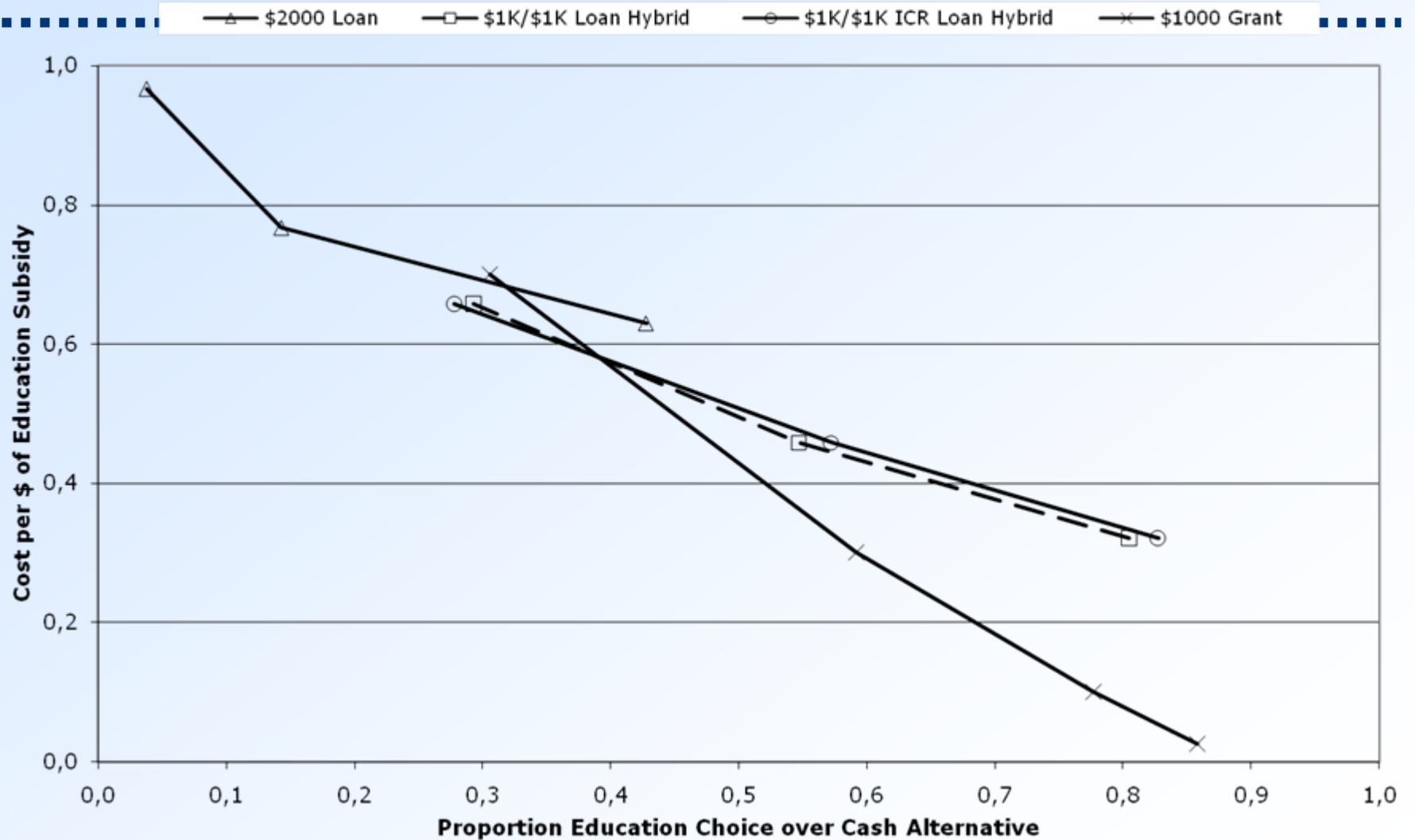
# Time Preference $r < 5$



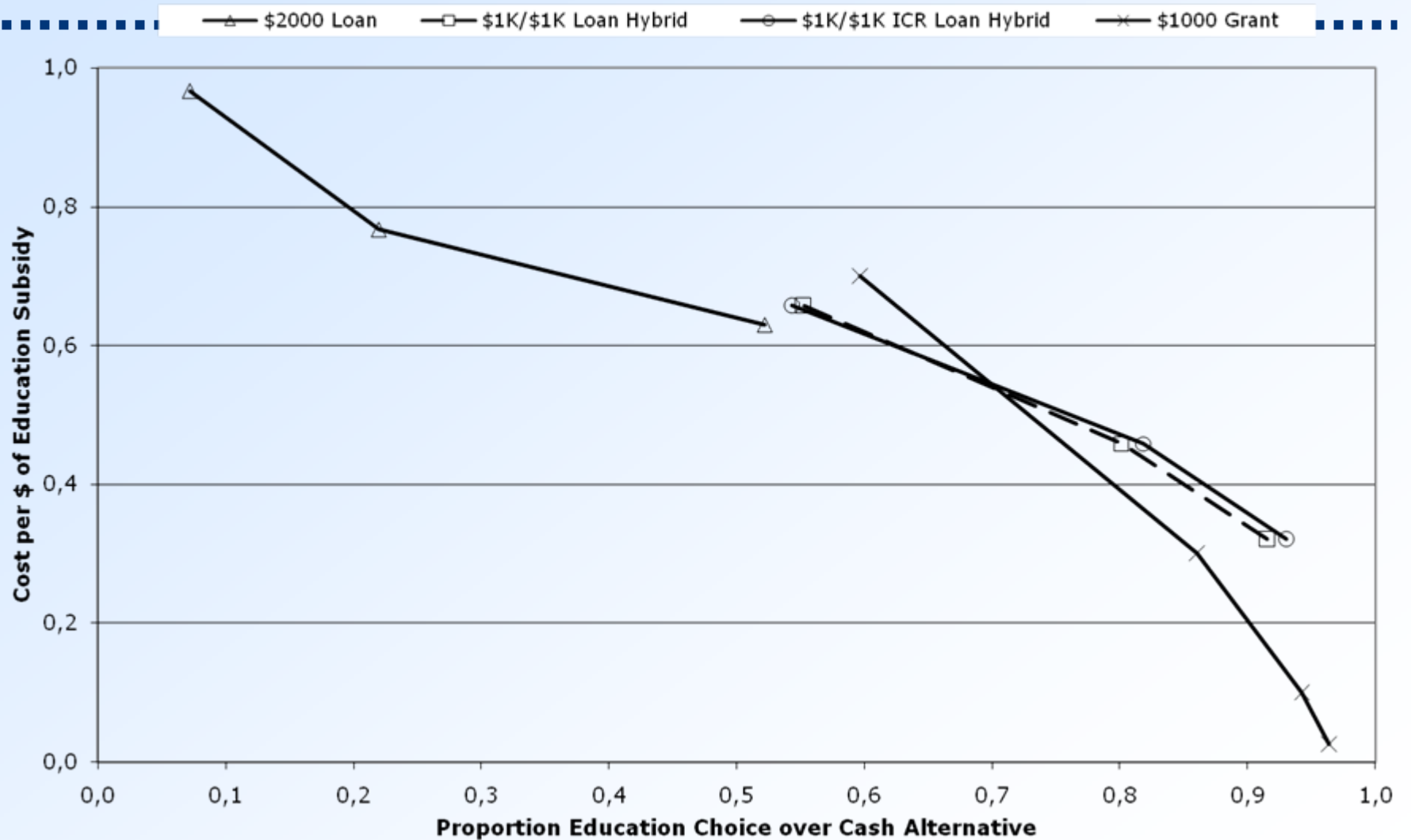
# Low Grades, < 60



# Medium Grades, 60 - 80

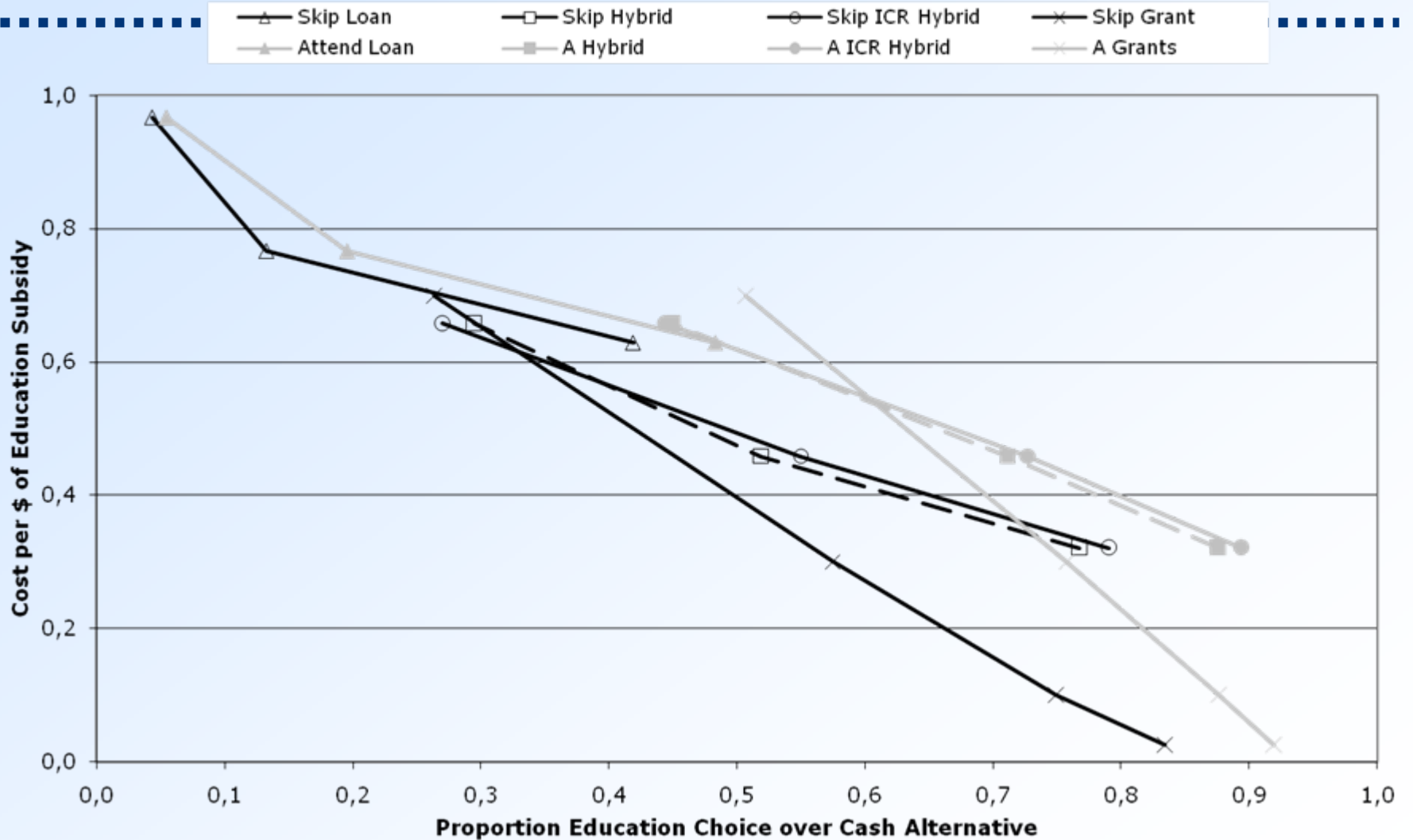


# High Grades, > 80

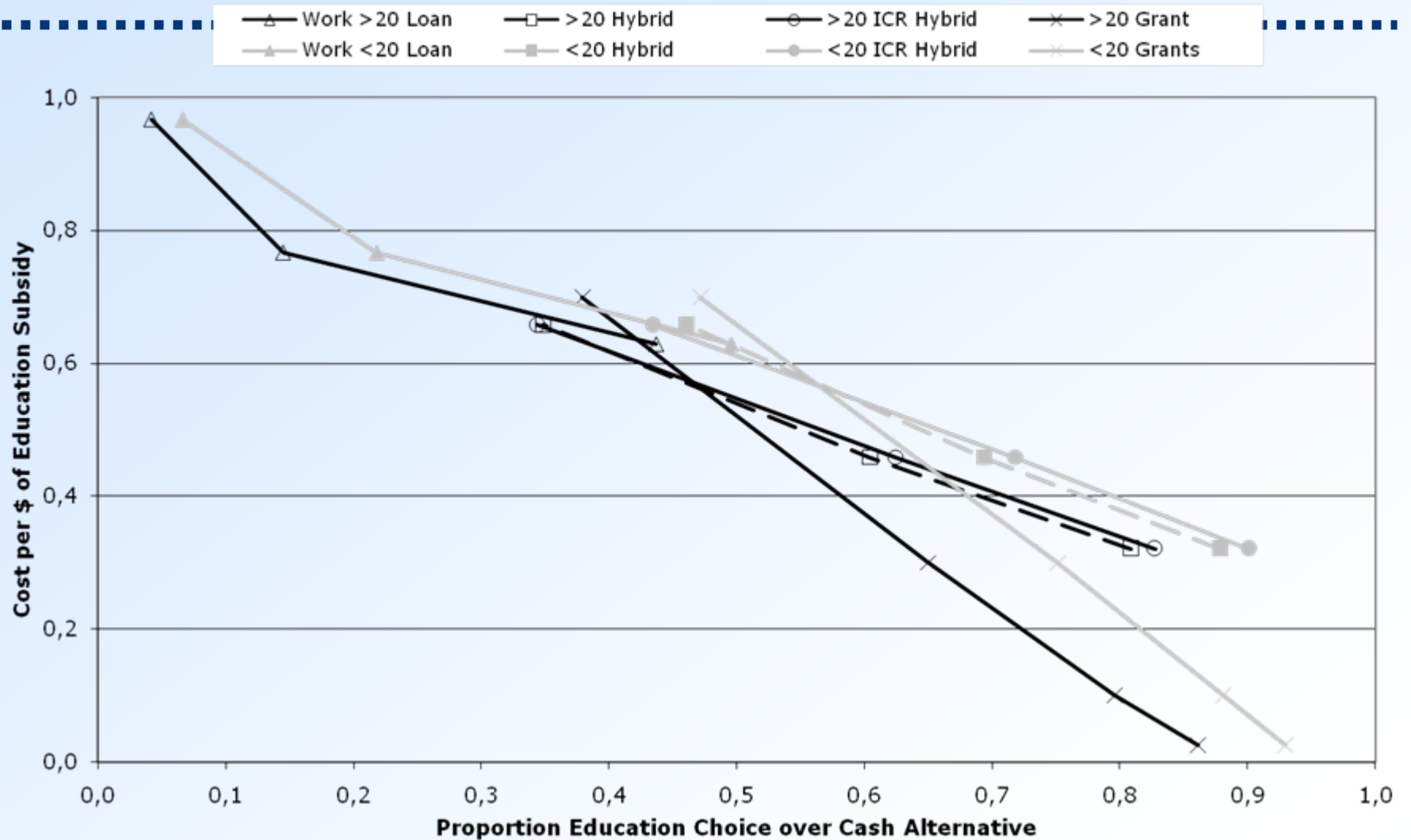




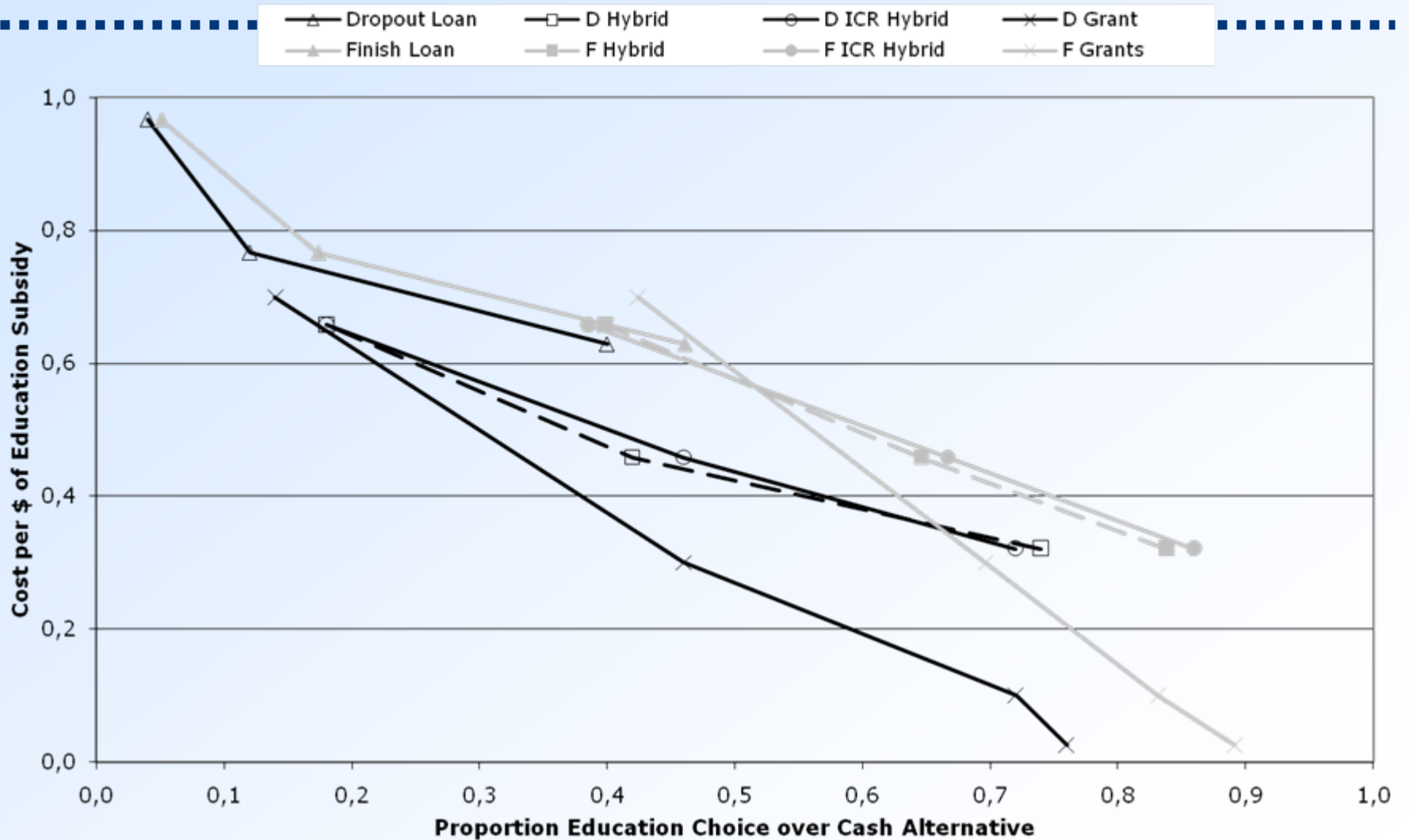
# Skip Class vs. Attend



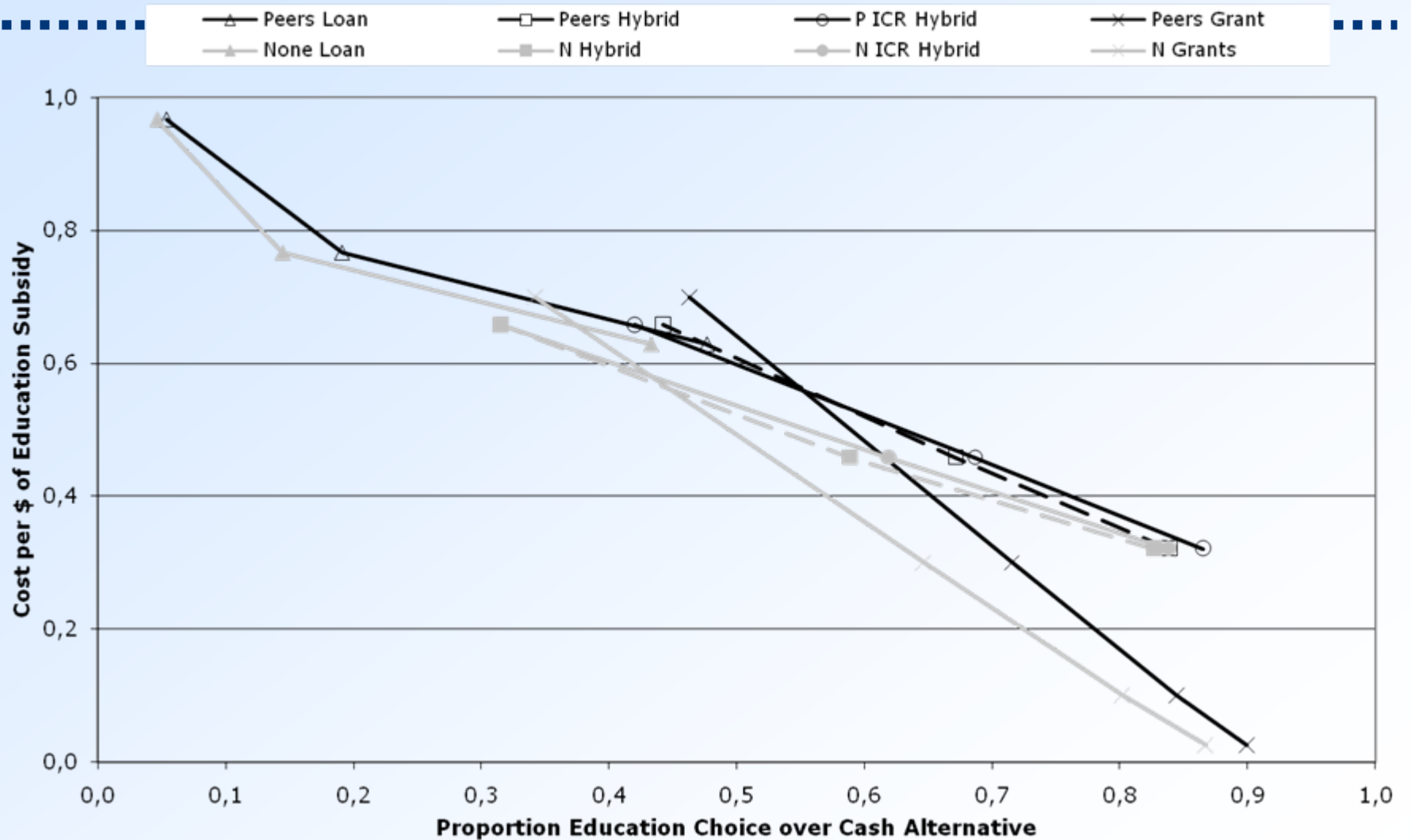
## Work > 20 hours vs. Work less



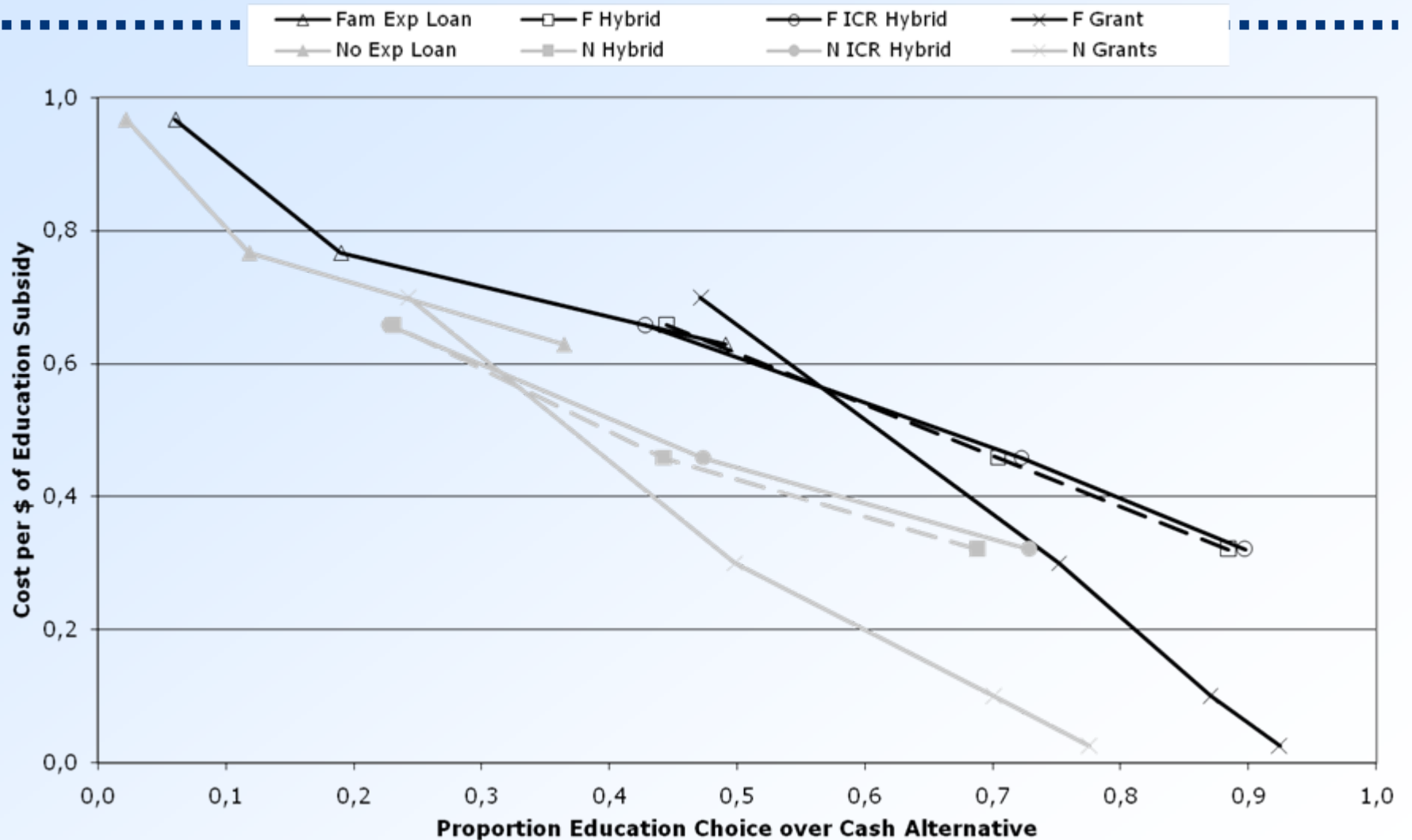
## Expect Dropout HS vs. Expect Finish HS



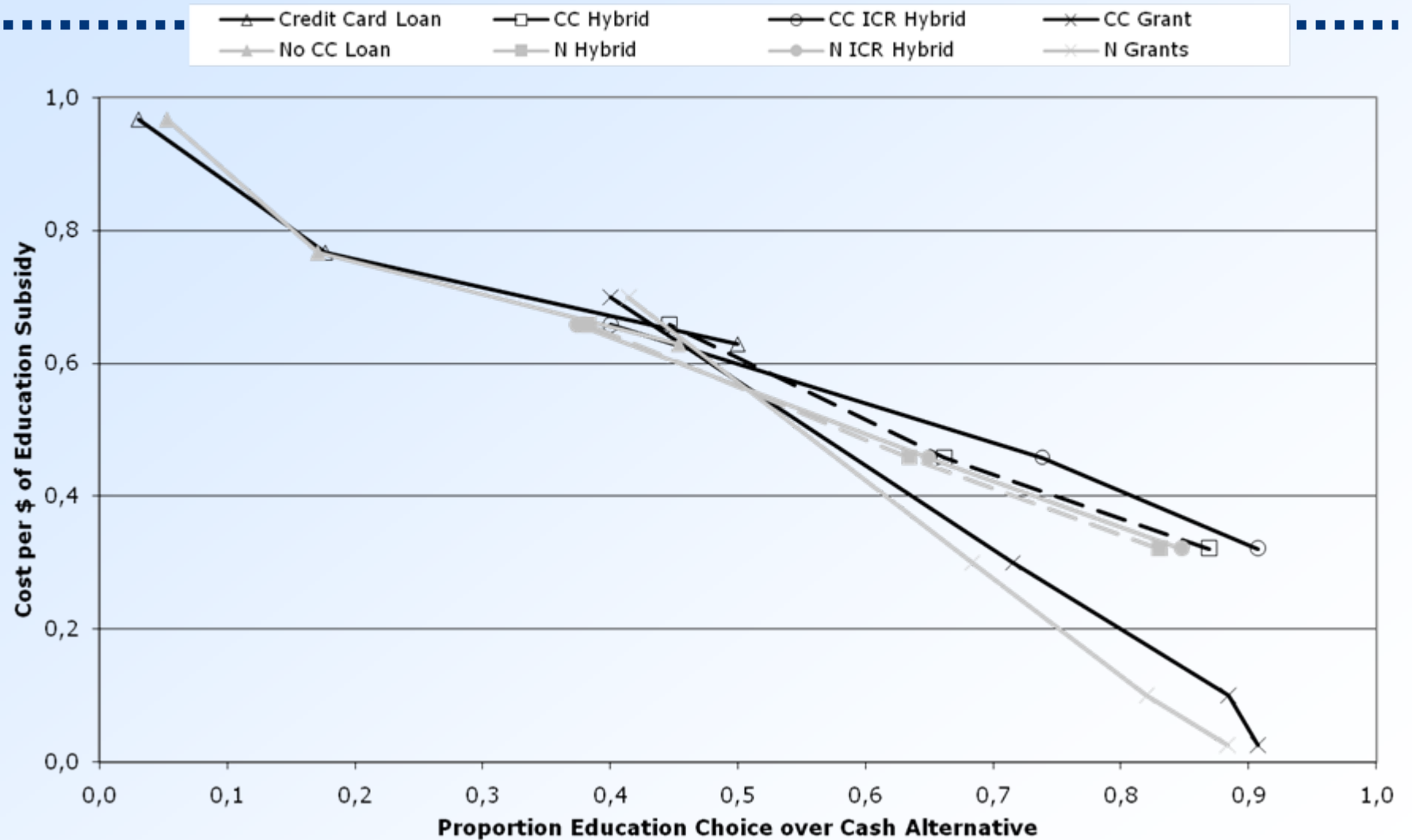
# Peers go to University vs. None



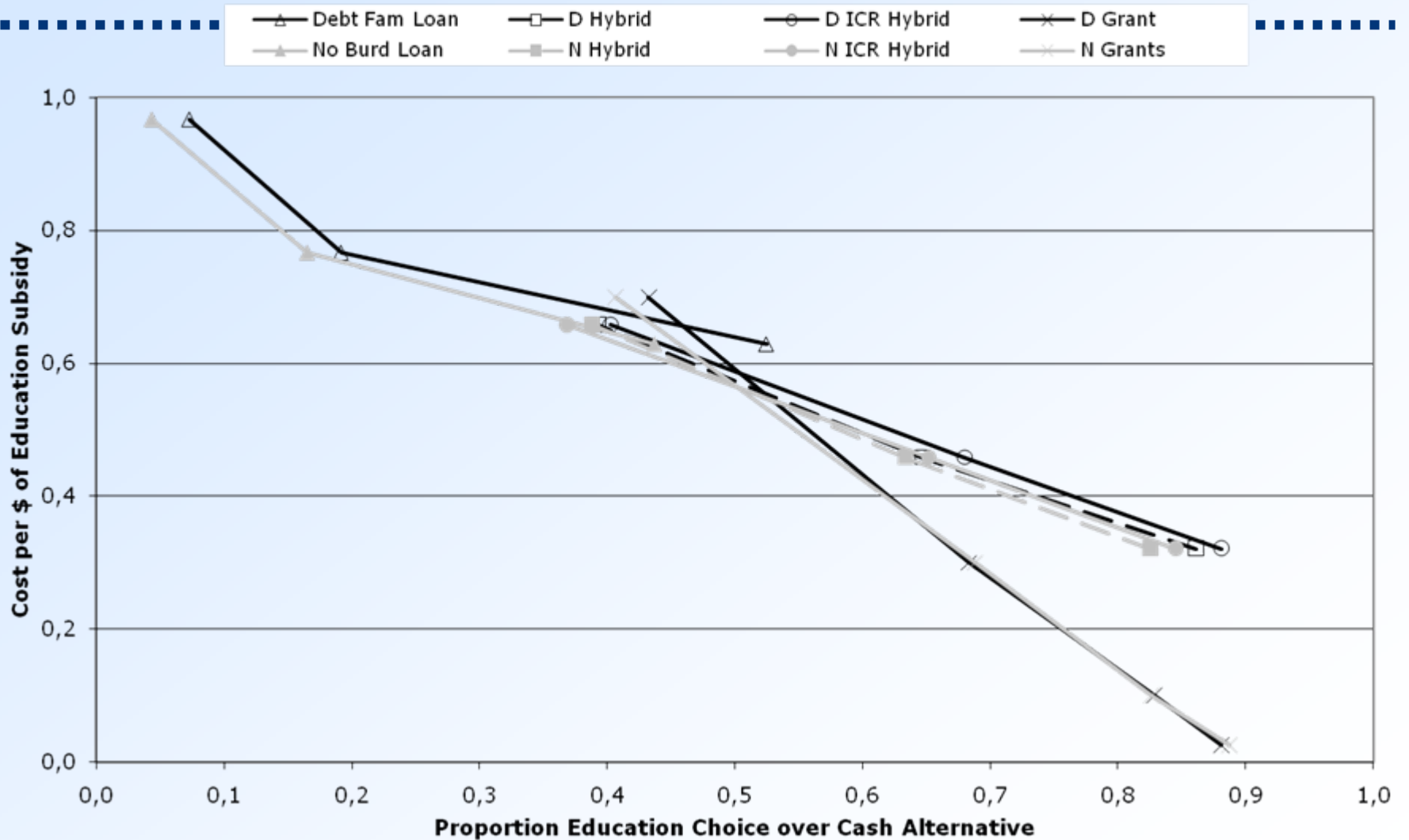
# Family Expectations vs. None



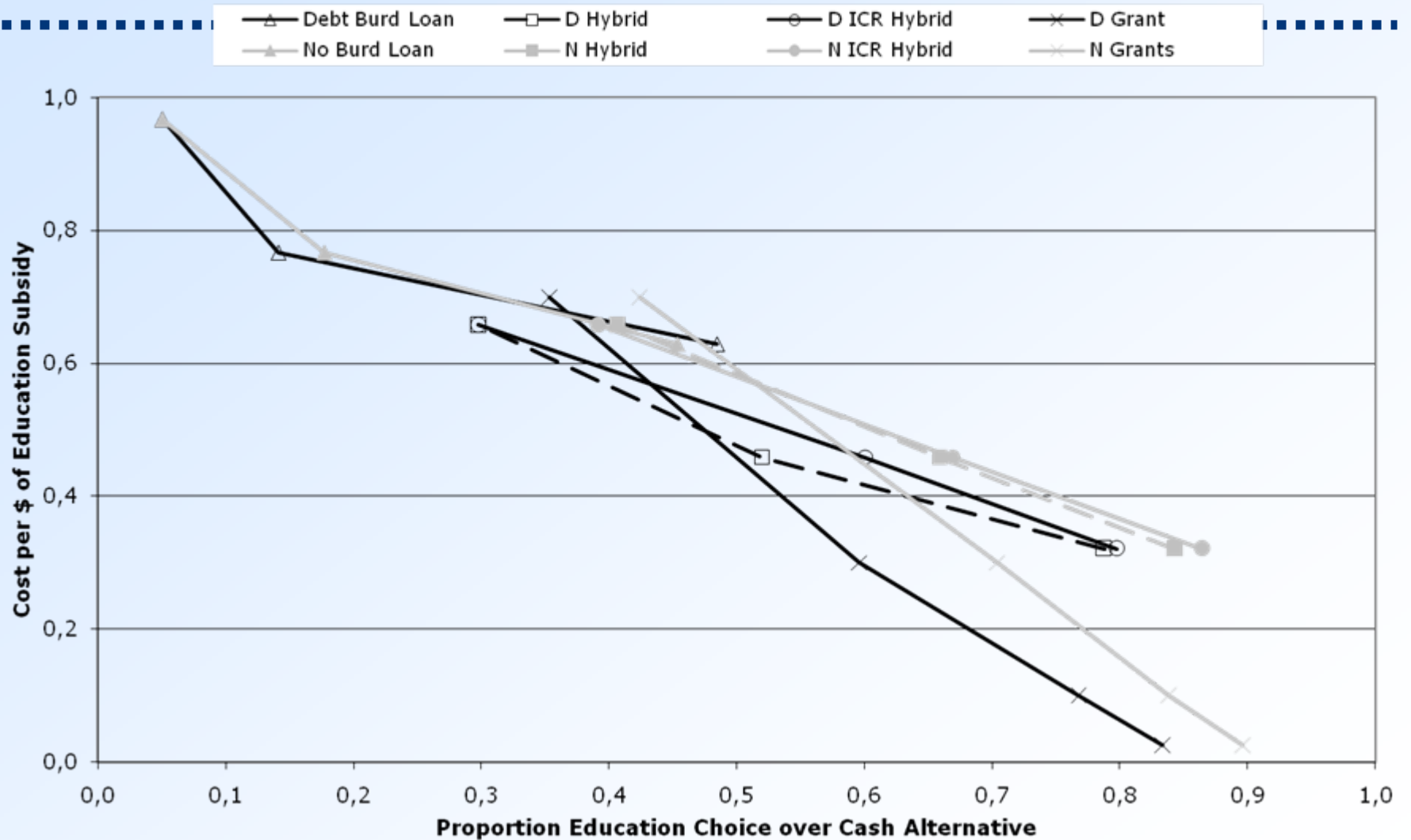
# Credit Cards vs. None



# Burdened by Family Debt vs. None

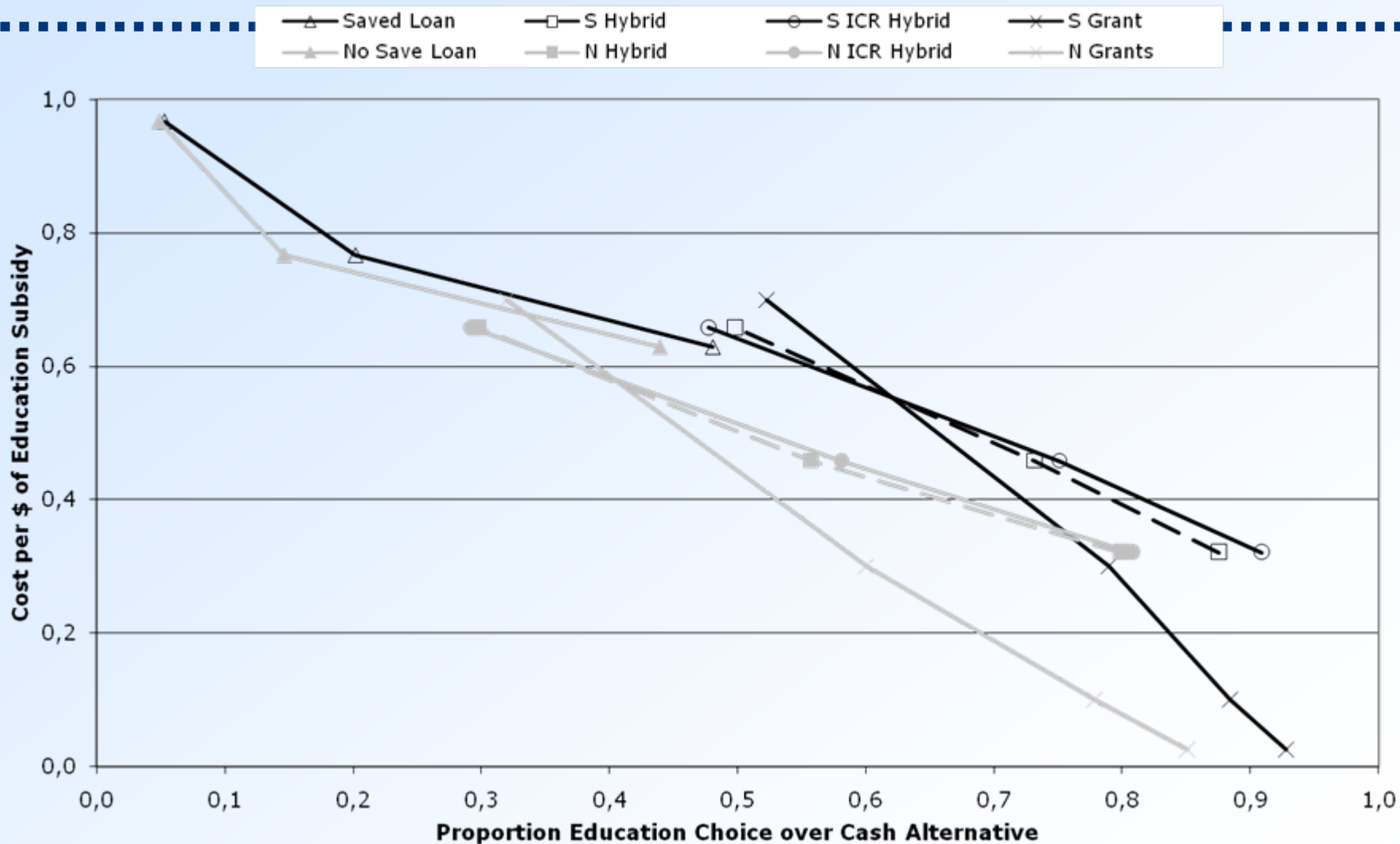


# Burdened by Debt vs. None





## Saved for PSE vs. None



# Regression Analysis to Examine:

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Firstly,

- Who is out of the market for PSE?
- Who's marginally interested?
- Who will go at any cost?

Secondly,

- Given that there is an interest in PSE, what matters?
- Does debt aversion matter?



# Initial Impressions

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	NEVER	ALWAYS
Loan	52.5%	4.4%
Hybrid (Loan + Grant)	15.2%	24.1%
ICR Hybrid	13.4%	24.8%
Grant	9.6%	31.3%

- NEVER : Student always took cash alternative when offered a PSE subsidy ( $P = 2.5$  cents per dollar too high)
- MARGINAL: Students took one to four PSE subsidies out of the 22 choices offered
- ALWAYS: Students took PSE alternative at least 21 times out of 22 times



# Probit Results:

## Never Accept PSE

---

- Increased Probability of Never Accepting
  - Manitoba (ON, QC)
  - Saskatchewan (ON, QC)
  - Work > 20 Hours
- Decrease Probability of Never Accepting
  - Willingness to Save (exp)
  - Risk Seeking (exp)
  - Grades > 80
  - Family Expectation
  - Planning Ability
  - Saved for PSE
  - Grades > 80



# Probit Results:

## Never Accept PSE

---

- Group variables (at risk groups) explain little of the variance of the dependent variable



## **Probit Results:**

**Marginally Accept PSE (=1)**

**Never Accept PSE (= 0)**

---

- Few coefficients significantly different from zero suggesting some slight differences between the two populations
- No inconsistencies found with respect to previous result
- Again, group variables explain little of the variance of dependent variable



# Probit Results:

## Always Accept PSE

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- Increased Probability of Always Accepting
  - Adult Student
  - Willingness to Save (exp)
  - Family Expectation
  - Family level of debt
  - **First Gen PSE**
  - Immigrant
- Decrease Probability of Always Accepting
  - Work > 20 Hours
  - Saskatchewan



# What Matters?

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- Dependent Variable

Accept Education  
Financing at least once

N = 1,135

Decisions: 22

Total observations: 24,970

- Control for

- Different forms of subsidies
- Subsidy levels
- Prices of subsidies
- Group variables
- Individual Characteristics
- Individual Attitudes





# What Matters: Technique

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- Linear Probability Model with a computed Inverse Mill Ratio (IMR)
- Allows us to use a selected sample, examining only those who chose some PSE financing along the way
- Pooling of individuals choosing among different subsidies enables us to account for an individual effect with GLS estimates
- Two-step Heckman procedure



# What Matters: Technique

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- The selection equation:  
The dependent variable is an indicator for the demand for education  
= 1 if the student chooses PSE for at least one decision and = 0 otherwise
- The Investment equation:  
The demand for education or willingness to pay for education conditional on having chosen one education choice (linear probability model)



# What Matters: Investment

	Model 1	Model 2	Model 3	Model 4	Model 5
Explanatory Variables	Price	Price	Price	Price	Price
		Subsidy Types	Subsidy Types	Subsidy Types	Subsidy Types
			P x Subsidy	P x Subsidy	P x Subsidy
				Group Variables	Group Variables Individual Characteristics
R <sup>2</sup> =	0.3464	0.3587	0.3738	0.3795	0.4054



# What Matters: Investment

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## 1<sup>st</sup> MODEL: Price only

- Regression coefficient on price is **NEGATIVE** and **HIGHLY SIGNIFICANT**
- $R^2 = 0.3464$



# What Matters: Investment

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## 2<sup>nd</sup> MODEL: Price + Subsidy types

- Regression coefficient on price is **NEGATIVE** and **HIGHLY SIGNIFICANT**
- $R^2 = 0.3587$
- Relative to the price, the different forms of subsidy don't matter much for the demand for education



# What Matters: Investment

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3<sup>rd</sup> MODEL: Price + Subsidy types + crosses

- Assume that the subsidies not only affect the intercepts of the demand curve, but also the slopes
- Regression coefficient on price is **NEGATIVE** and **HIGHLY SIGNIFICANT**
- Grants generate more demand only when price is above \$0.517 per dollar of PSE subsidy
- Hybrids generate more demand only when price is above \$0.693 per dollar of PSE subsidy
- $R^2 = 0.3738$



# What Matters: Investment

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## 4<sup>th</sup> MODEL: + Group variables

- Results on price and subsidy variables remain robust
- $R^2 = 0.3795$

### Group Variables

- + Immigrant
- + Adult Student
- Aborigines
- Quebec



# What Matters: Investment

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## 5<sup>th</sup> MODEL: + Individual Characteristics (>20)

- Results on price and subsidy variables remain robust
- $R^2 = 0.4054$

### Group Variables

- + Immigrant
- + Adult Student
- Aboriginals
- Saskatchewan

### Individual Variables

- + Females
- + **Willingness to Save (Exp)**
- + Planning Ability (scale)
- + Personal saving for PSE
- + Family Debt
- Work > 20 hours
- mid range grades





# Debt Aversion

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Little evidence that debt aversion exists

- Categories of subsidies → little effect
- Level of debt burden → never significant
- Level of family debt → when significant, wrong direction for debt aversion



# Debt Aversion

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What about those participants that take grants but never loans?

- Coherent with the concept of debt aversion
- 12.2% of participants
- Who are these participants?



# Debt Aversion

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What about those participants that take grants but never loans?

- Probit regression
- Dependent variable = 1 if participant has always chosen the grant and never a loan (and 0 otherwise)



# Debt Aversion: Probability of jointly always accepting a grant and never a loan?

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## Increase Probability of “debt averse”

---

- Willing to save
- Family expectations
- Have saved for PSE
- Have credit cards

## Decrease Probability of “debt averse”

---

- Aboriginal
- Renters (Montreal)
- First Generation PSE



# Debt Aversion: Probability of jointly always accepting a grant and never a loan?

---

## Increase Probability of “debt averse”

---

- Willing to save
- Family expectations
- Have saved for PSE
- Have credit cards

## Decrease Probability of “debt averse”

---

- Aboriginal
- Renters (Montreal)
- First Generation PSE

Hardly coherent with the concept of debt aversion



# Debt Aversion: Probability of jointly always accepting a grant and never a loan?

---

## Increase Probability of “debt averse”

---

- Willing to save
- Family expectations
- Have saved for PSE
- Have credit cards

## Decrease Probability of “debt averse”

---

- Aboriginal
- Renters (Montreal)
- First Generation PSE

Perhaps these students don't need loans to pursue PSE, but will gladly accept grants



# Debt Aversion: Probability of jointly always accepting a grant and never a loan?

---

## Increase Probability of “debt averse”

---

- Willing to save
- Family expectations
- Have saved for PSE
- Have credit cards

## Decrease Probability of “debt averse”

---

- Aboriginal
- Renters from Montreal
- First Generation PSE

Demonstrates that these participants are not actually debt averse



# Conclusion

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- Price matters!
- Form of financial aid has little effect
- We cannot generalize the idea that debt aversion is a barrier for particular subgroups at this time.





# Conclusion

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- Willingness to save is a key factor to predict those who are likely to invest in PSE
- Belonging to a particular sub-group does not influence demand for financial aid, except for First Nation (-) or Immigrant (+)
- More analysis needed regarding the effect of numeracy and several other attitudes and behaviour variables in explaining demand for financial aid

