Games Economists Play: Immigration

2007 Capital Campus California Fall Retreat

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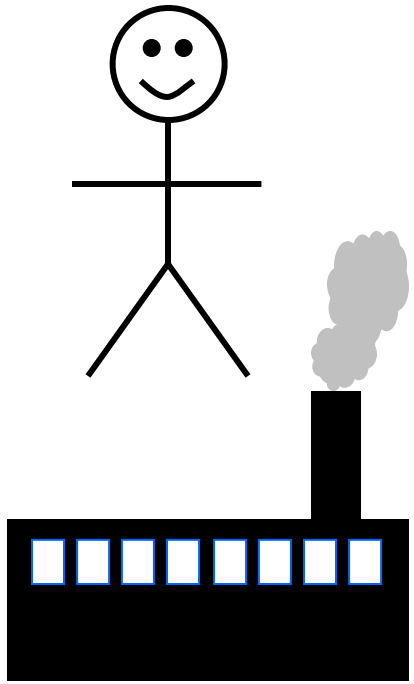
The Players and the Goals

In this experiment, there are WORKERS and FIRMS.

WORKERS sell labor to the FIRMS.



FIRMS make and sell stuff.

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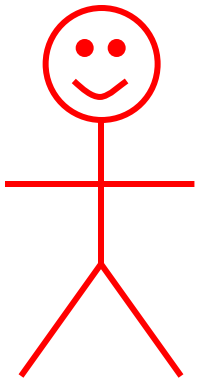
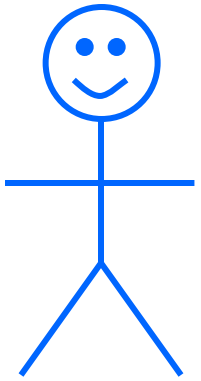
The Players and the Goals

Two types of worker

- Red workers



- Blue workers

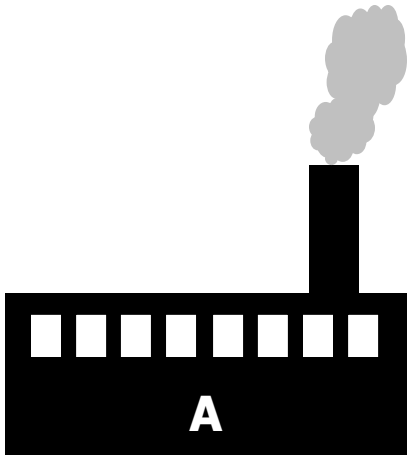


Goal: Earn as much money as possible

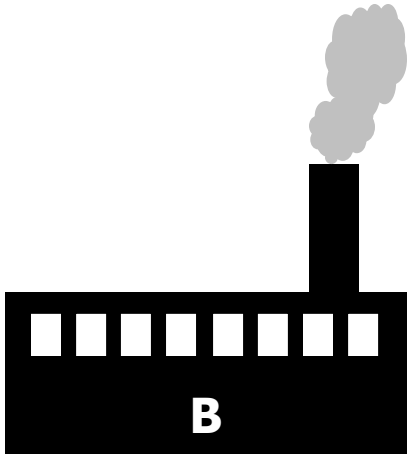
The Players and the Goals

Two Types of Firms

- Industry A Firms

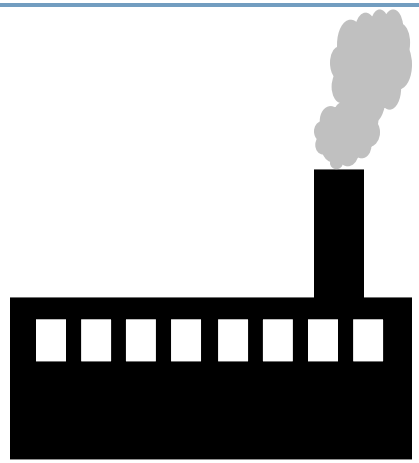


- Industry B Firms



Goal: Maximize profit (sales minus cost of labor)

The Players and the Goals



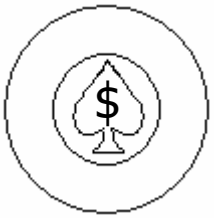
Firms

- Firms hire Red Labor and Blue Labor to produce their products.
- Firms automatically sell everything they produce for $10 per unit.
- Both types of firms need both Red Labor and Blue Labor

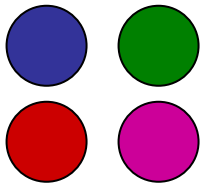
The Objects

= 1 hour of Blue labor

= 1 hour of Red labor



= 1 dollar



= 2 dollars (each)

Phases of Play

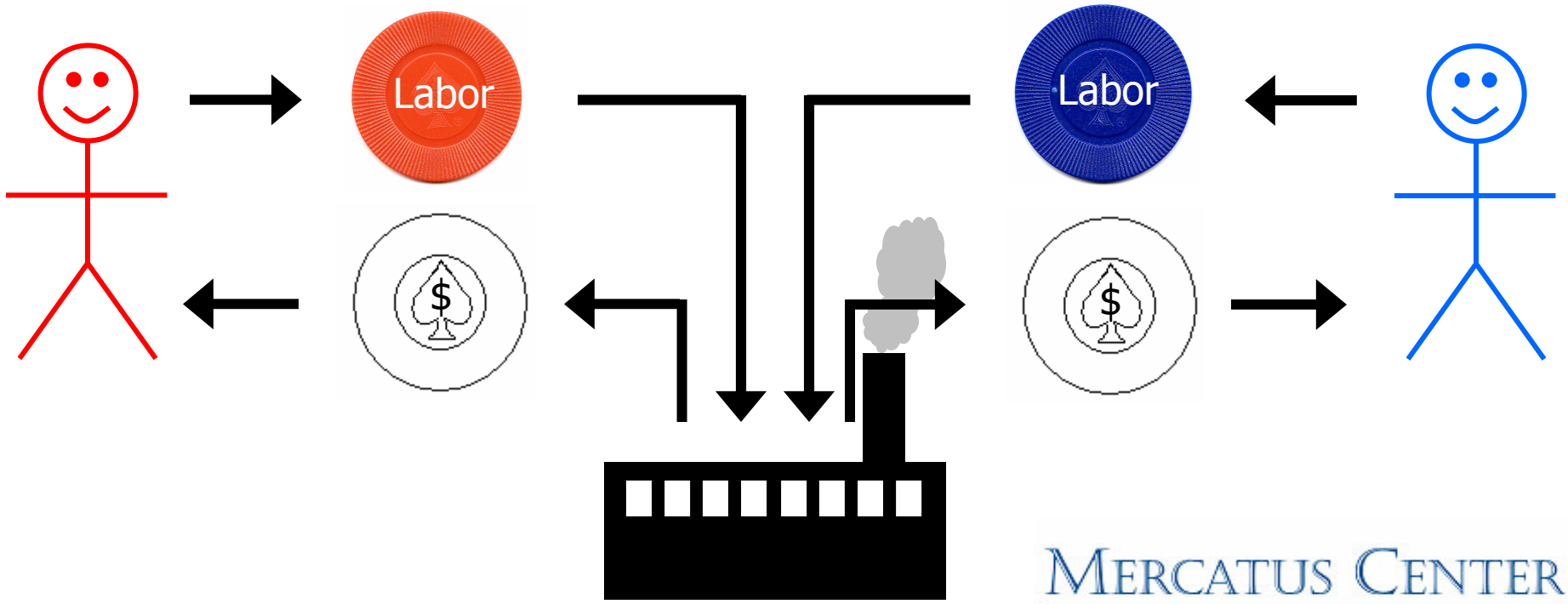
1. Labor and production round

2. Calculations round

Phases of Play

1. Labor market and production round

Red workers and Blue workers sell as much labor as you can to firms for $.



Phases of Play

1. Labor market and production round

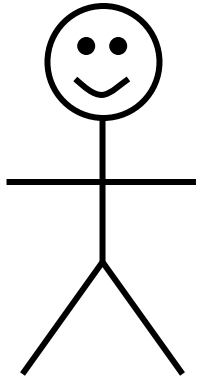
Units of Red Labor

Units of Blue Labor	0	1	2	3	4	5	6	7	8	9	10
0	0.0	0.5	0.9	1.3	1.6	1.9	2.2	2.5	2.7	3.0	3.2
1	0.2	0.9	1.4	1.8	2.2	2.6	3.0	3.3	3.6	3.9	4.2
2	0.4	1.1	1.7	2.2	2.7	3.1	3.5	3.8	4.2	4.5	4.9
3	0.5	1.3	1.9	2.5	3.0	3.4	3.9	4.3	4.7	5.0	5.4
4	0.6	1.5	2.1	2.7	3.3	3.7	4.2	4.6	5.1	5.5	5.8
5	0.7	1.6	2.3	2.9	3.5	4.0	4.5	5.0	5.4	5.8	6.2
6	0.8	1.7	2.5	3.1	3.7	4.3	4.8	5.2	5.7	6.1	6.6
7	0.9	1.8	2.6	3.3	3.9	4.5	5.0	5.5	6.0	6.4	6.9
8	0.9	1.9	2.7	3.4	4.1	4.7	5.2	5.7	6.2	6.7	7.1
9	1.0	2.0	2.9	3.6	4.2	4.8	5.4	5.9	6.5	6.9	7.4
10	1.1	2.1	3.0	3.7	4.4	5.0	5.6	6.1	6.7	7.2	7.7

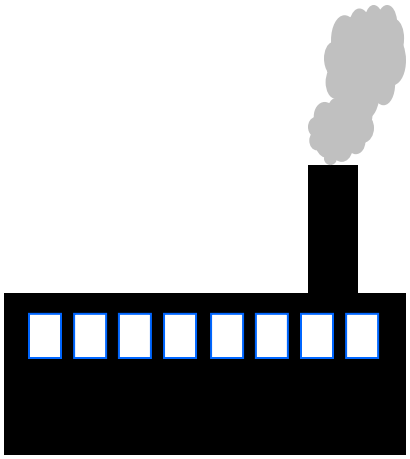
Units of output produced

Phases of Play

2. Calculations round



Report: Income, Unsold Labor



Report: Blue labor, Red labor, Ending Cash

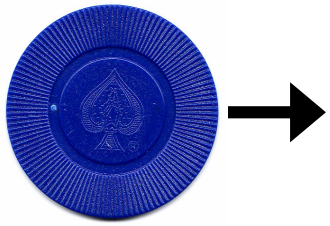
Example: Labor Round

Blue worker 1 Sells 6  to Firm A1 for $3 each.

Red worker 2 Sells 8  to Firm A1 for $3 each.

Example: Labor Round

Firm A1 manufactures 5.7 units of product.
The product will be automatically sold for $10 per unit.



	0	1	2	3	4	5	6	7	8	9	10
0	0.0	0.5	0.9	1.3	1.6	1.9	2.2	2.5	2.7	3.0	3.2
1	0.2	0.9	1.4	1.8	2.2	2.6	3.0	3.3	3.6	3.9	4.2
2	0.4	1.1	1.7	2.2	2.7	3.1	3.5	3.8	4.2	4.5	4.9
3	0.5	1.3	1.9	2.5	3.0	3.4	3.9	4.3	4.7	5.0	5.4
4	0.6	1.5	2.1	2.7	3.3	3.7	4.2	4.6	5.1	5.5	5.8
5	0.7	1.6	2.3	2.9	3.5	4.0	4.5	5.0	5.4	5.8	6.2
6	0.8	1.7	2.5	3.1	3.7	4.3	4.8	5.2	5.7	6.1	6.6
7	0.9	1.8	2.6	3.3	3.9	4.5	5.0	5.5	6.0	6.4	6.9
8	0.9	1.9	2.7	3.4	4.1	4.7	5.2	5.7	6.2	6.7	7.1
9	1.0	2.0	2.9	3.6	4.2	4.8	5.4	5.9	6.5	6.9	7.4
10	1.1	2.1	3.0	3.7	4.4	5.0	5.6	6.1	6.7	7.2	7.7

Example: Utility and Profit Round

Worker 1

Ends the experiment with (6)($3) = $18.

Worker 2

Ends the experiment with (8)($3) = $24.

Firm A1

- spent $42 on labor, and
- produced 5.7 output and sold them at a price of $10 each.

→ Firm A1's profit is $57 – $42 = $15.

Example: Cost/Benefit of Hiring More Labor

1 Blue hour costs $3; 1 Red hour costs $2.

So far, you have hired 3 Blue hours and 1 Red hour.

What happens if you hire 1 more Red hour?

1. How much are you producing right now?

   Type A Firm: *3 Blue and 1 Red → 1.8 output*

   Type B Firm: *3 Blue and 1 Red → 1.3 output*

2. What happens to your output if you hire 1 more Red hour?

   Type A Firm: *Output increases from 1.8 to 2.2 → + 0.4 output*

   Type B Firm: *Output increases from 1.3 to 1.9 → + 0.6 output*

Example: Cost/Benefit of Hiring More Labor

1 Blue hour costs $3; 1 Red hour costs $2.

So far, you have hired 3 Blue hours and 1 Red hour.

What happens if you hire 1 more Red hour?

3. What does that do to your revenue?

   Type A Firm: *(+0.4 output)($10) = + $4 revenue*

   Type B Firm: *(+0.6 output)($10) = + $6 revenue*

4. What does it do to your costs?

   Cost of 1 Red hour = $2 → + $2 cost

Example: Cost/Benefit of Hiring More Labor

1 Blue hour costs $3; 1 Red hour costs $2.

So far, you have hired 3 Blue hours and 1 Red hour.

What happens if you hire 1 more Red hour?

5. What does it do to your profit?

   Type A Firm: *+ $4 revenue – $2 cost → + $2 profit*

   Type B Firm: *+ $6 revenue – $2 cost → + $4 profit*

Example: Cost/Benefit of Hiring More Labor

1 Blue hour costs $3; 1 Red hour costs $2.

So far, you have hired 3 Blue hours and 1 Red hour.

What happens if you hire 1 more Blue hour?

1. How much are you producing right now?

   Type A Firm: *3 Blue and 1 Red → 1.8 output*

   Type B Firm: *3 Blue and 1 Red → 1.3 output*

2. What happens to your output if you hire 1 more Blue hour?

   Type A Firm: *Output increases from 1.8 to 2.2 → + 0.4 output*

   Type B Firm: *Output increases from 1.3 to 1.5 → + 0.2 output*

Example: Cost/Benefit of Hiring More Labor

1 Blue hour costs $3; 1 Red hour costs $2.

So far, you have hired 3 Blue hours and 1 Red hour.

What happens if you hire 1 more Blue hour?

3. What does that do to your revenue?

   Type A Firm: *(+0.4 output)($10) = + $4 revenue*

   Type B Firm: *(+0.2 output)($10) = + $2 revenue*

4. What does it do to your costs?

   Cost of 1 Blue hour = $3 → + $3 cost

Example: Cost/Benefit of Hiring More Labor

1 Blue hour costs $3; 1 Red hour costs $2.

So far, you have hired 3 Blue hours and 1 Red hour.

What happens if you hire 1 more Blue hour?

5. What does it do to your profit?

   Type A Firm: *+ $4 revenue – $3 cost → + $1 profit*

   Type B Firm: *+ $2 revenue – $3 cost → – $1 profit*

Example: Cost/Benefit of Hiring More Labor

1 Blue hour costs $3; 1 Red hour costs $2.

So far, you have hired 3 Blue hours and 1 Red hour.

Conclusion

Type A Firm: *Hiring 1 more Red increases profit by $2*

Hiring 1 more Blue increases profit by $1

Type B Firm: *Hiring 1 more Red increases profit by $4*

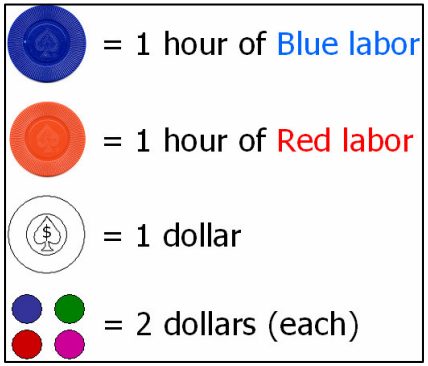
Hiring 1 more Blue decreases profit by $1

Trading Rules

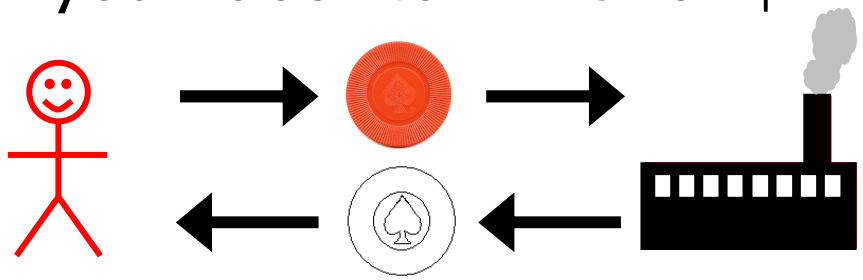
- Firms must always remain in their seats.
- Workers display cards indicating their per-hour ask prices.
- Workers are allowed to leave their seats, but only when summoned by a firm.
- Workers must return to their seats after completing the transaction.
- Only 1 unit of labor can be sold per transaction.

Ready to begin…

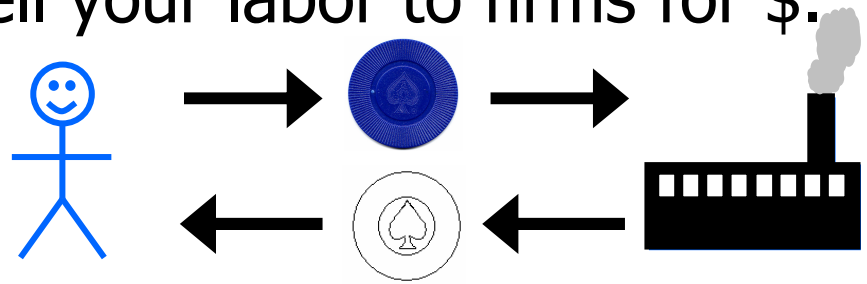
Labor Market and Production Round



Red workers sell your labor to firms for $.



Blue workers sell your labor to firms for $.



Firms: Every unit of output you produce is sold for $10 at the end of the round.

Calculations Round

1. Red workers report unsold labor and ending money.
2. Blue workers report unsold labor and ending money.
3. Firms report blue labor, red labor, and ending money.

New Rules

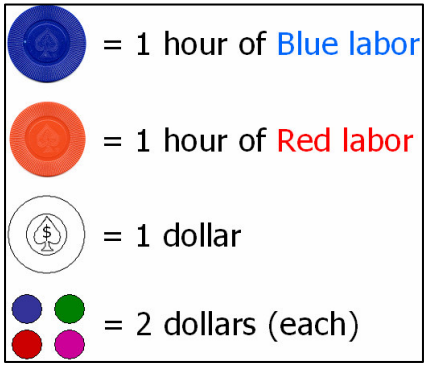
Due to immigration, the number of Blue worker hours has doubled.

Type A Firms sell output for $6.40 per unit.

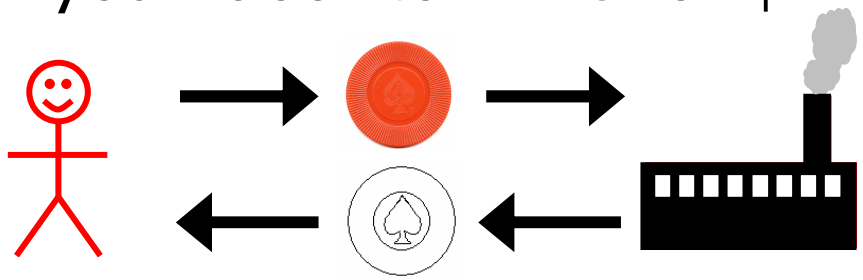
Type B Firms sell output for $8.00 per unit.

Ready to begin…

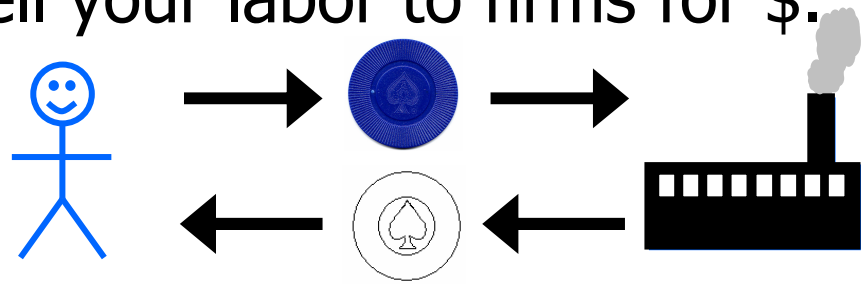
Labor Market and Production Round



Red workers sell your labor to firms for $.



Blue workers sell your labor to firms for $.



Firms: Type A Firms sell their output for $6.40 per unit.
Type B Firms sell their output for $8.00 per unit.

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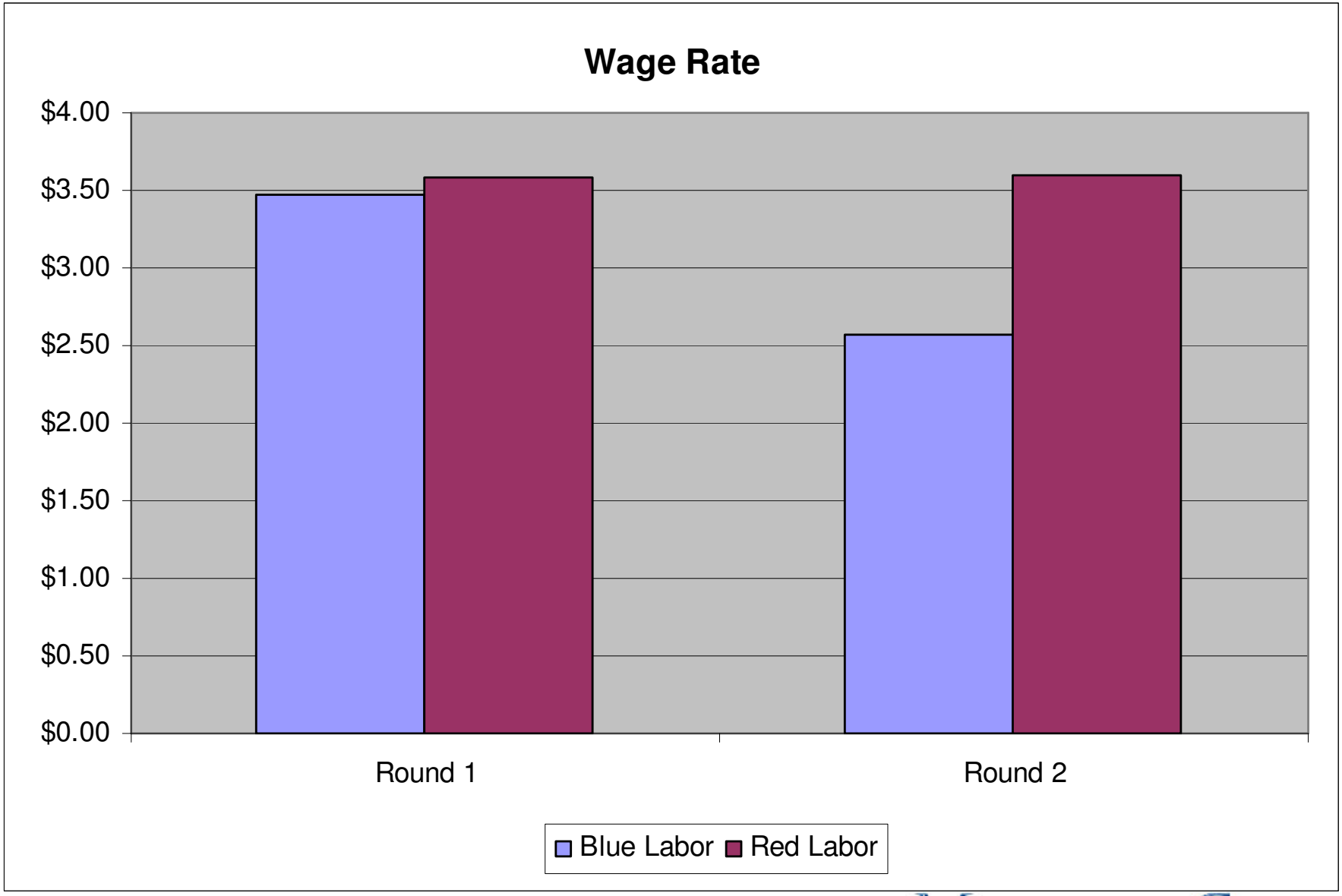
Utility and Profits Round

1. Red workers report unsold labor and ending money.
2. Blue workers report unsold labor and ending money.
3. Firms report their labor hiring and ending money.

Results…



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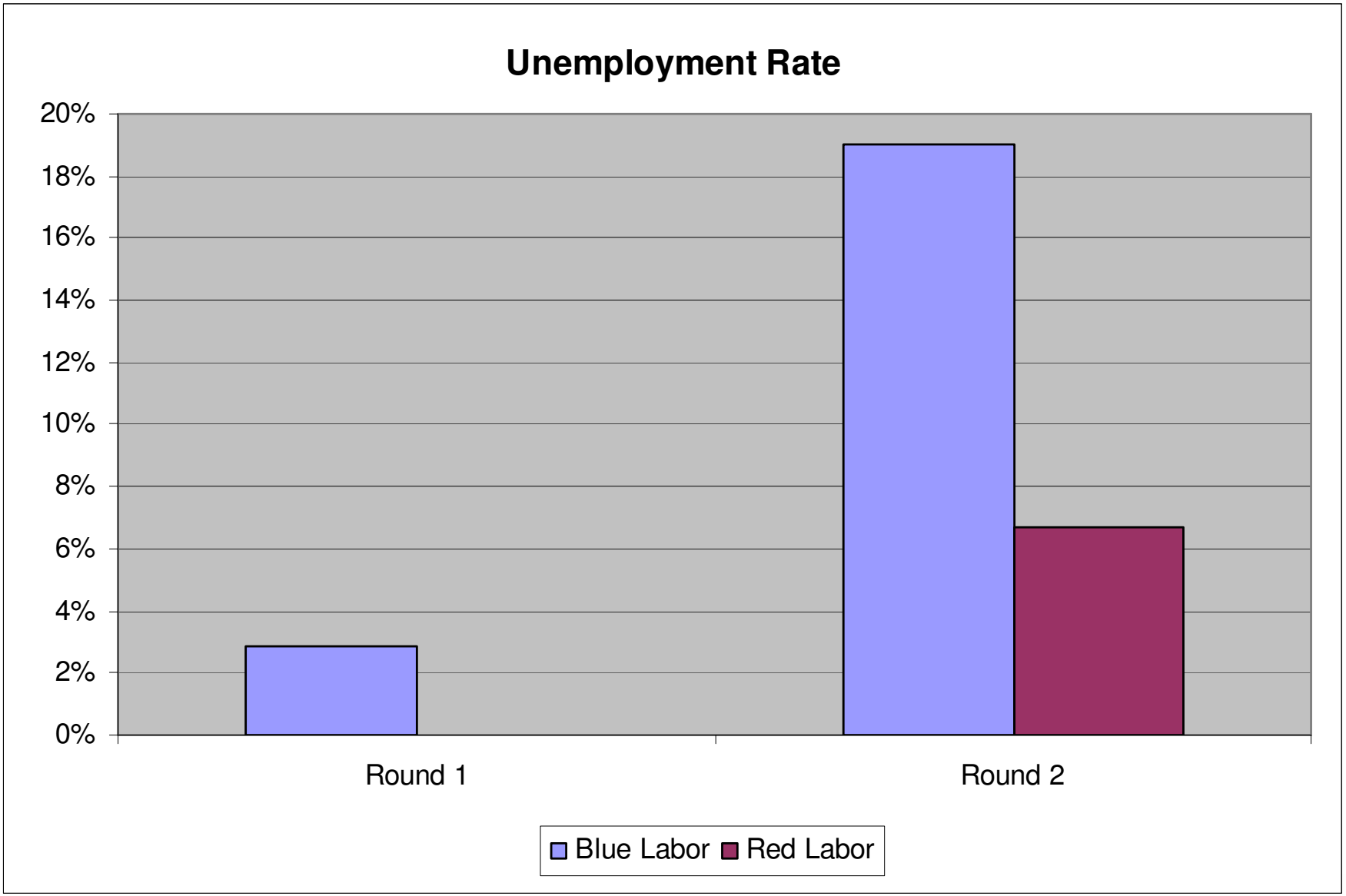

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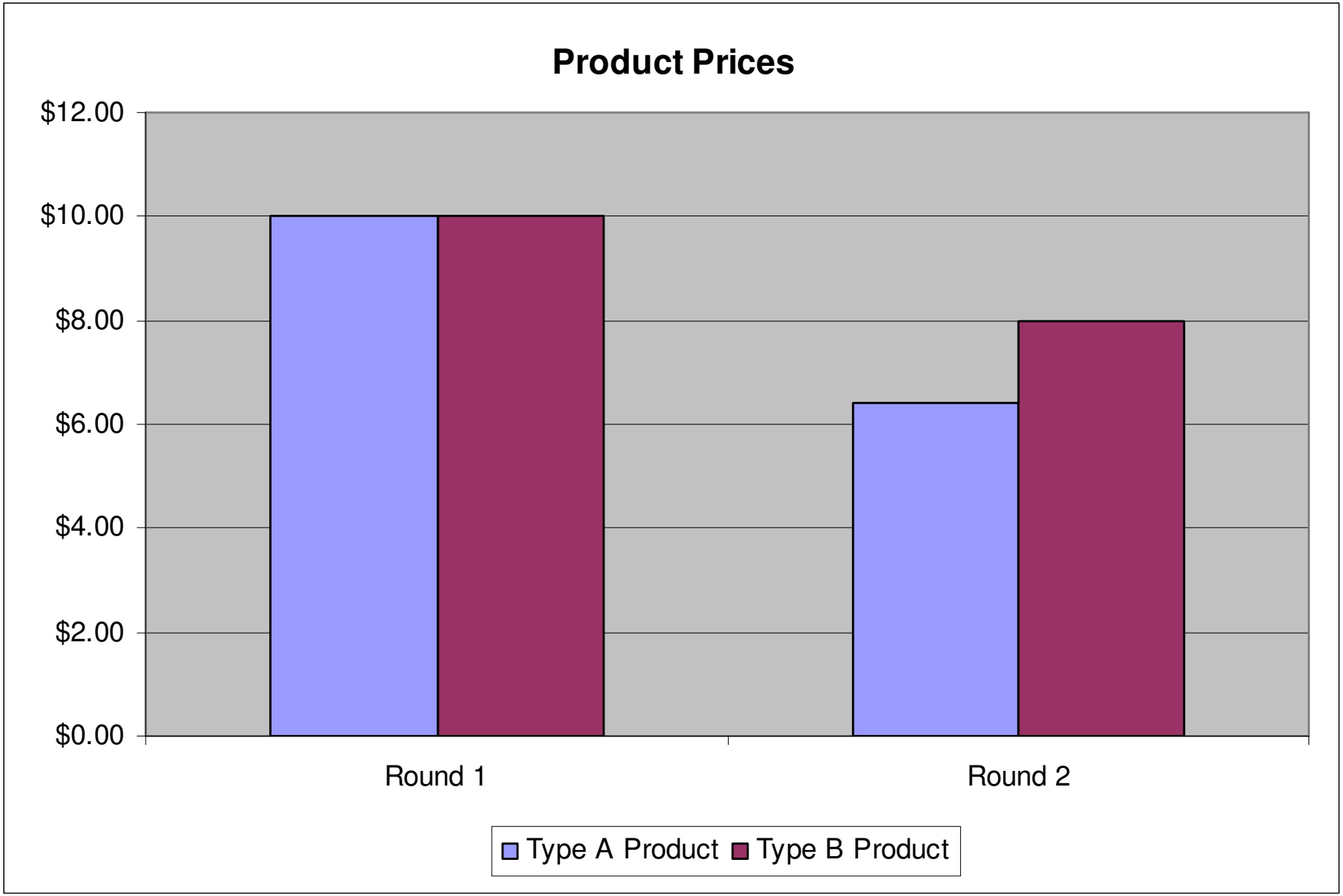
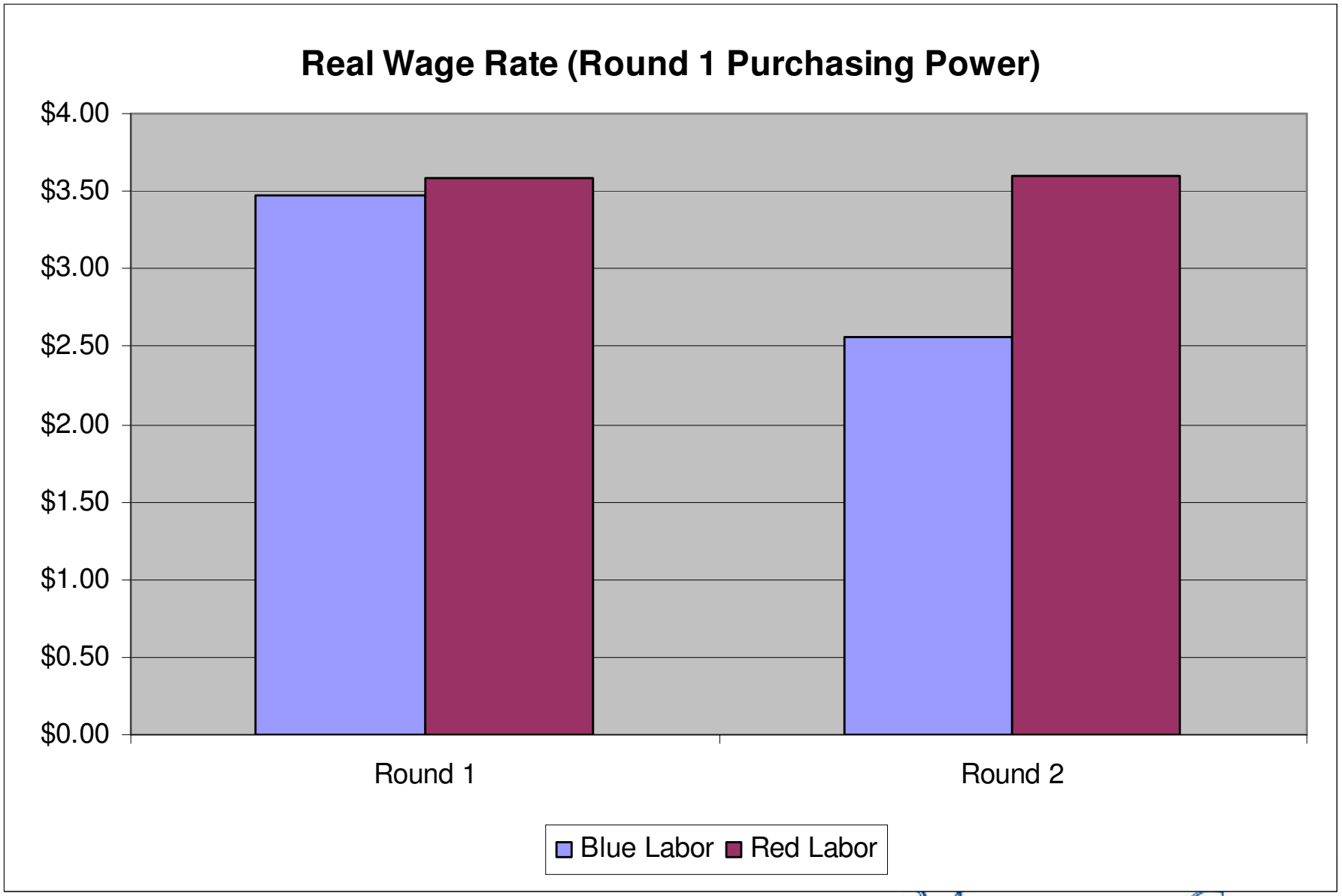
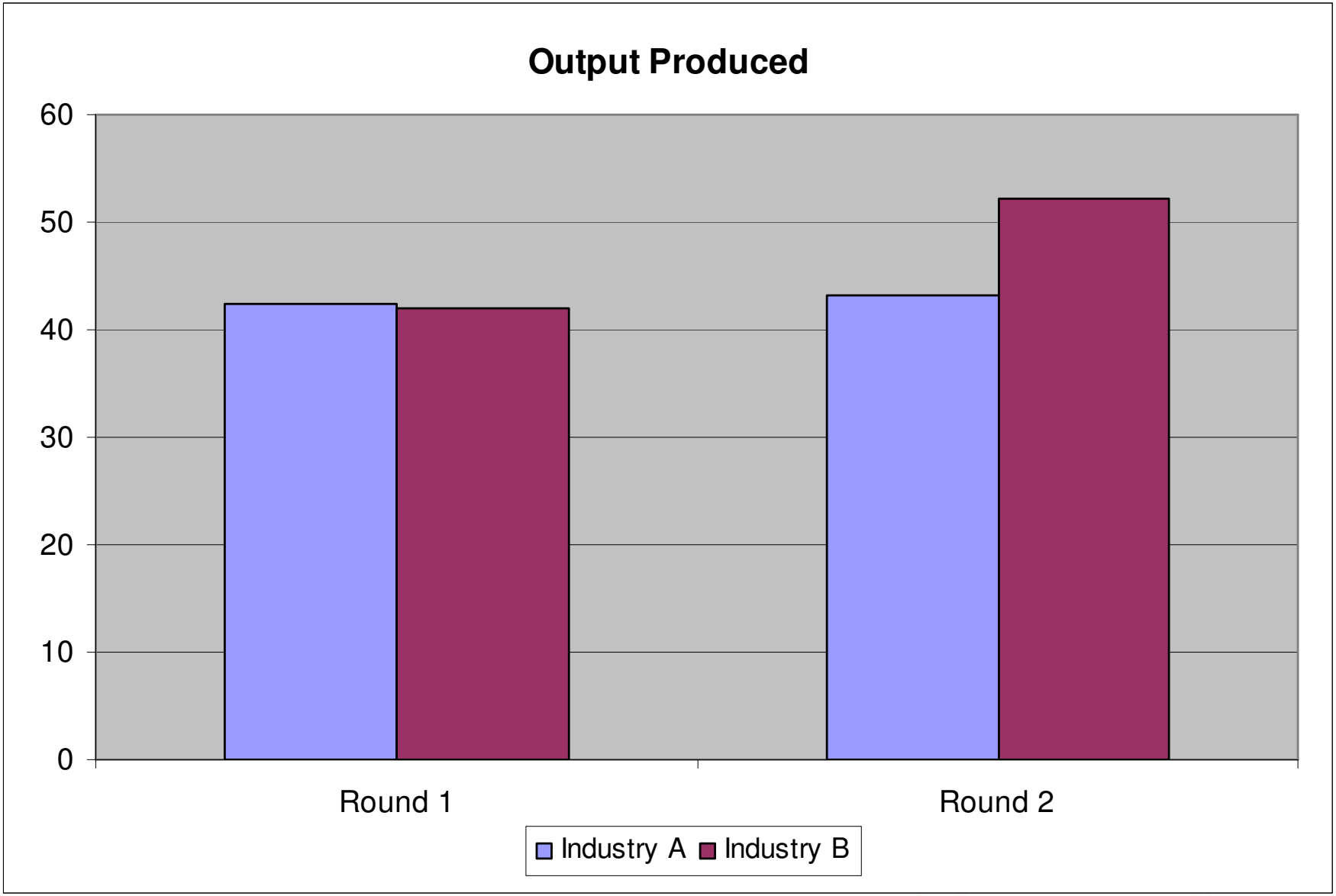

Product Prices
$12.00
$10.00
$8.00
$6.00
$4.00
$2.00
$0.00
Round 1
Round 2
Type A Product
Type B Product


Real Wage Rate (Round 1 Purchasing Power)
$4.00
$3.50
$3.00
$2.50
$2.00
$1.50
$1.00
$0.50
$0.00
Round 1
Round 2
Blue Labor
Red Labor



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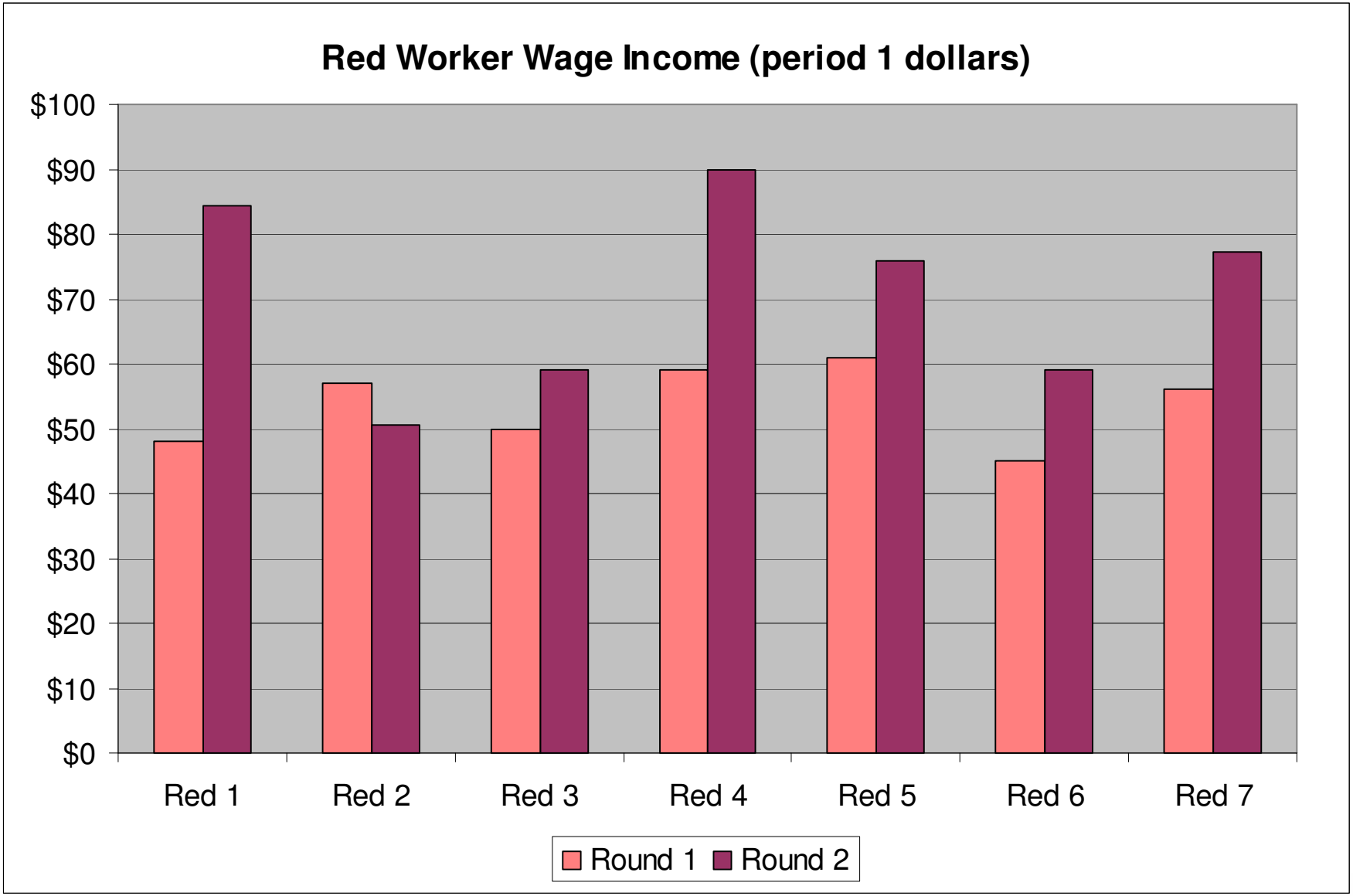
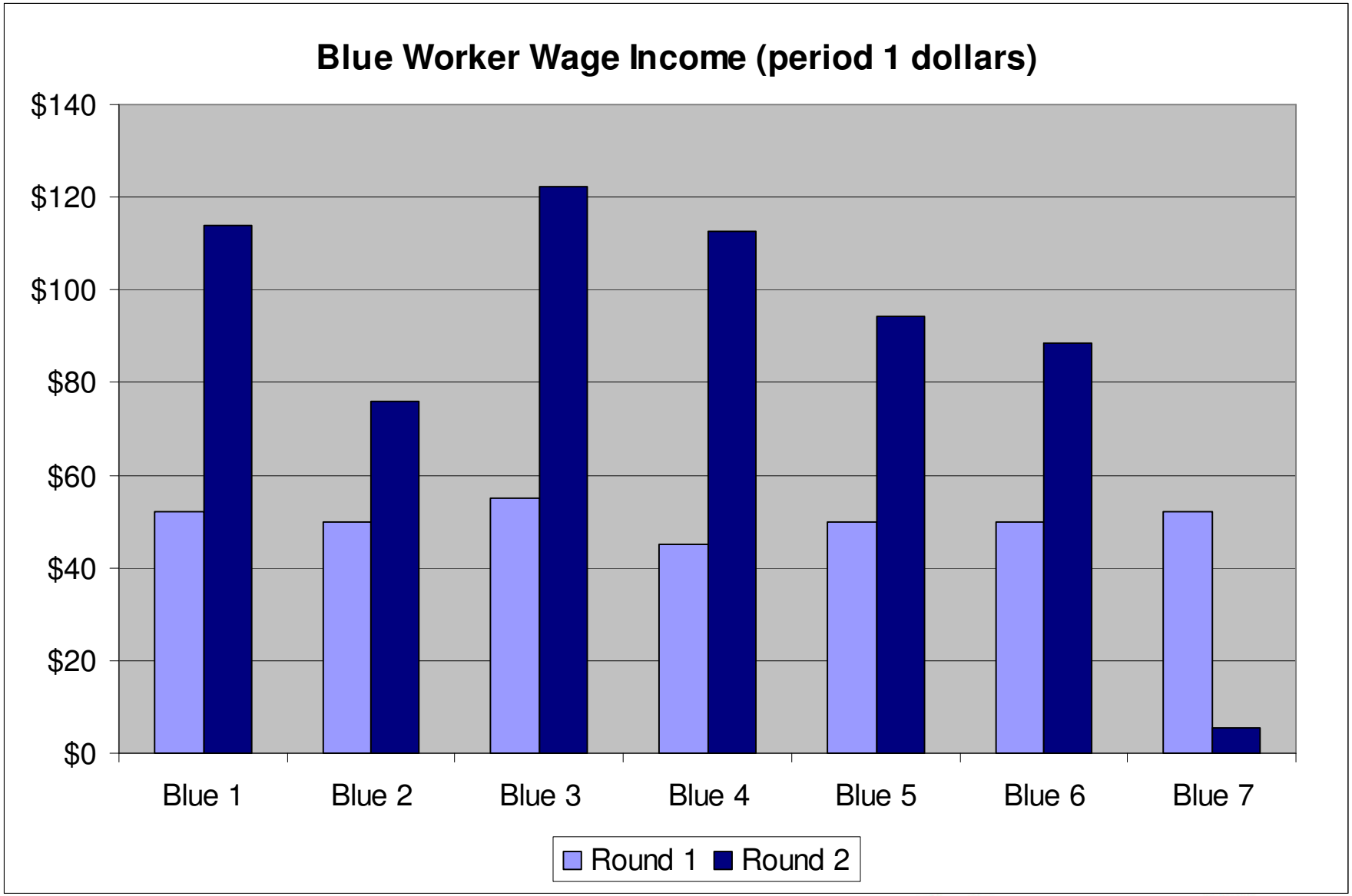
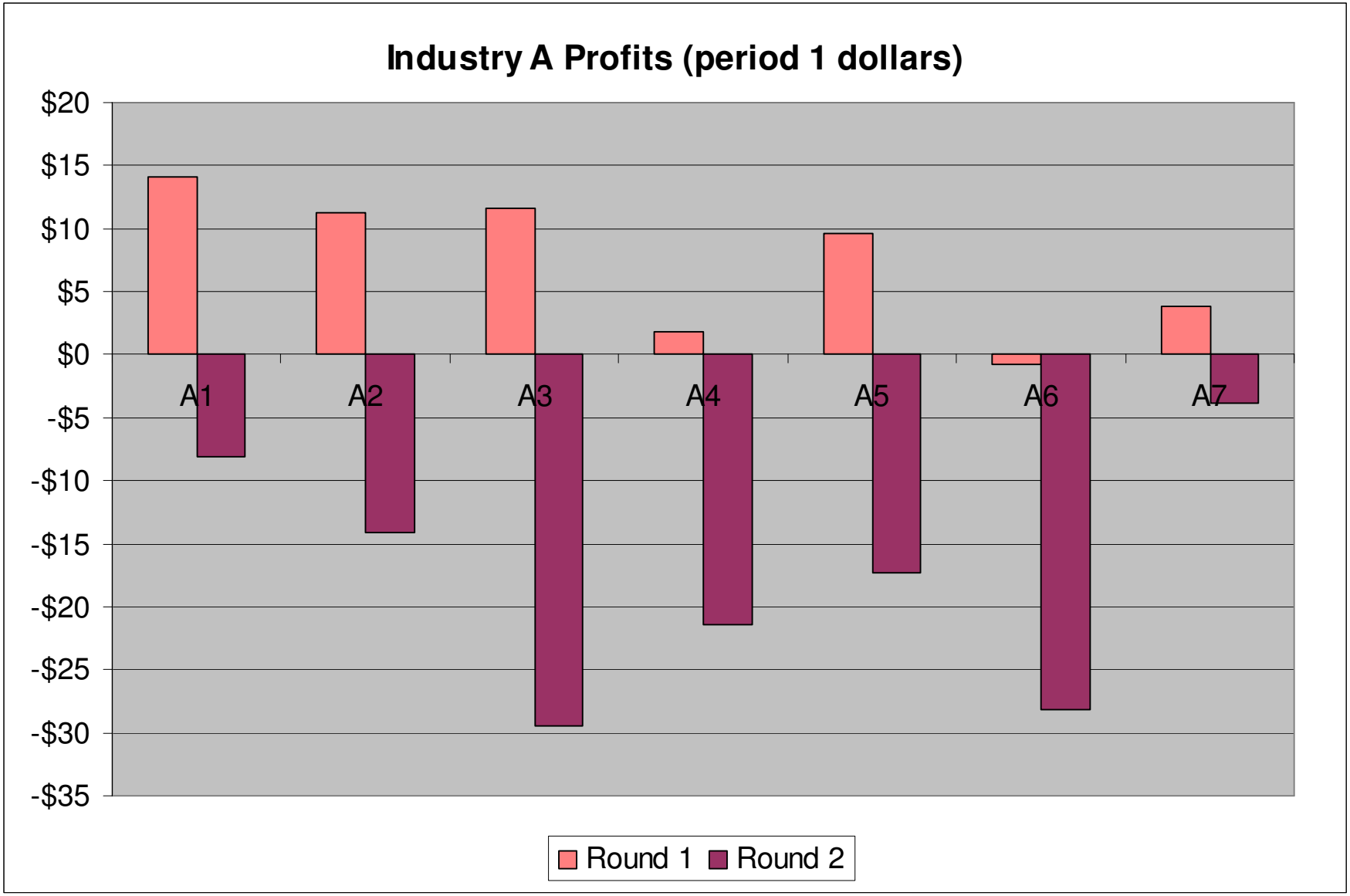
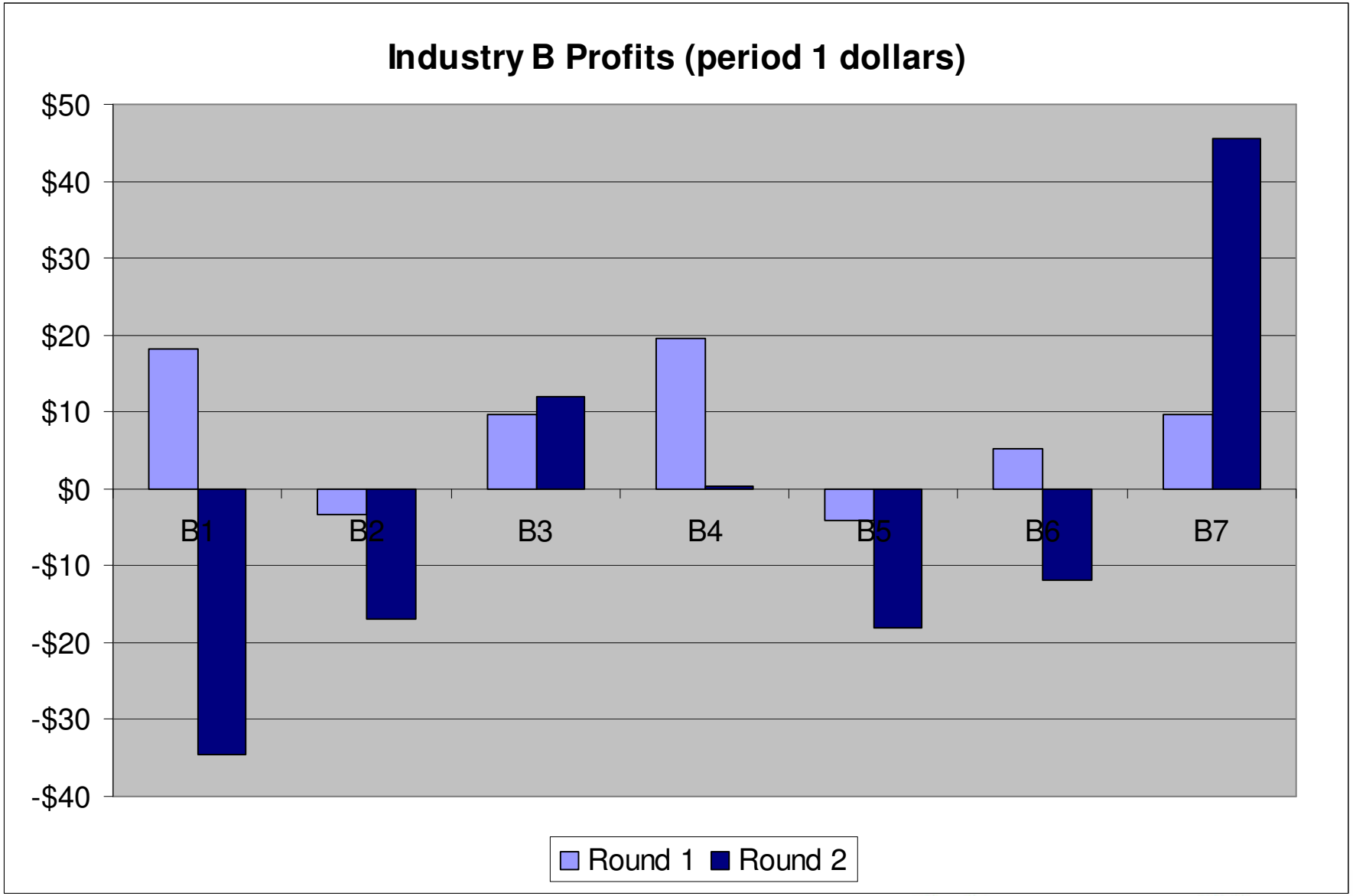

Red Worker Wage Income (period 1 dollars)
$100
$90
$80
$70
$60
$50
$40
$30
$20
$10
$0
Red 1
Red 2
Red 3
Red 4
Red 5
Red 6
Red 7
Round 1
Round 2


Blue Worker Wage Income (period 1 dollars)
$140
$120
$100
$80
$60
$40
$20
$0
Blue 1
Blue 2
Blue 3
Blue 4
Blue 5
Blue 6
Blue 7
Round 1
Round 2


Industry A Profits (period 1 dollars)
$20
$15
$10
$5
$0
-$5
-$10
-$15
-$20
-$25
-$30
-$35
A1
A2
A3
A4
A5
A6
A7
Round 1
Round 2


Industry B Profits (period 1 dollars)
$50
$40
$30
$20
$10
$0
-$10
-$20
-$30
-$40
B1
B2
B3
B4
B5
B6
B7
Round 1
Round 2

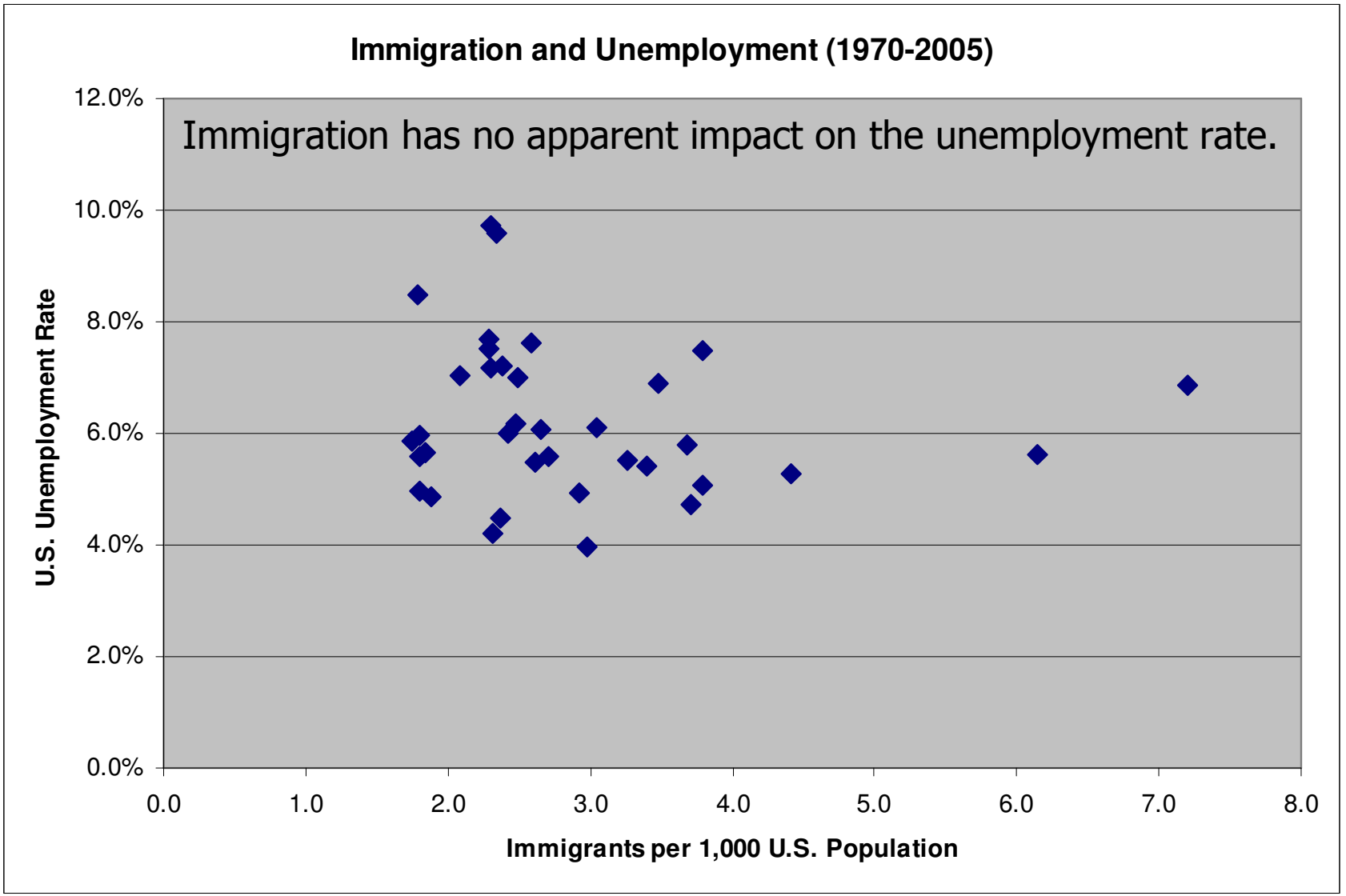
What is the impact of immigration on jobs and incomes?

- Unemployment rate?

  → Conventional wisdom: Immigrants take jobs away from Americans thereby increasing the unemployment rate.

- Income distribution?

  → Conventional wisdom: Immigrants represent an influx of lower income people thereby worsening the distribution of income.



Source: *Current Population Survey, 2005*, Minnesota Population Center; *Statistical Abstract of the US*, Bureau of the Census.

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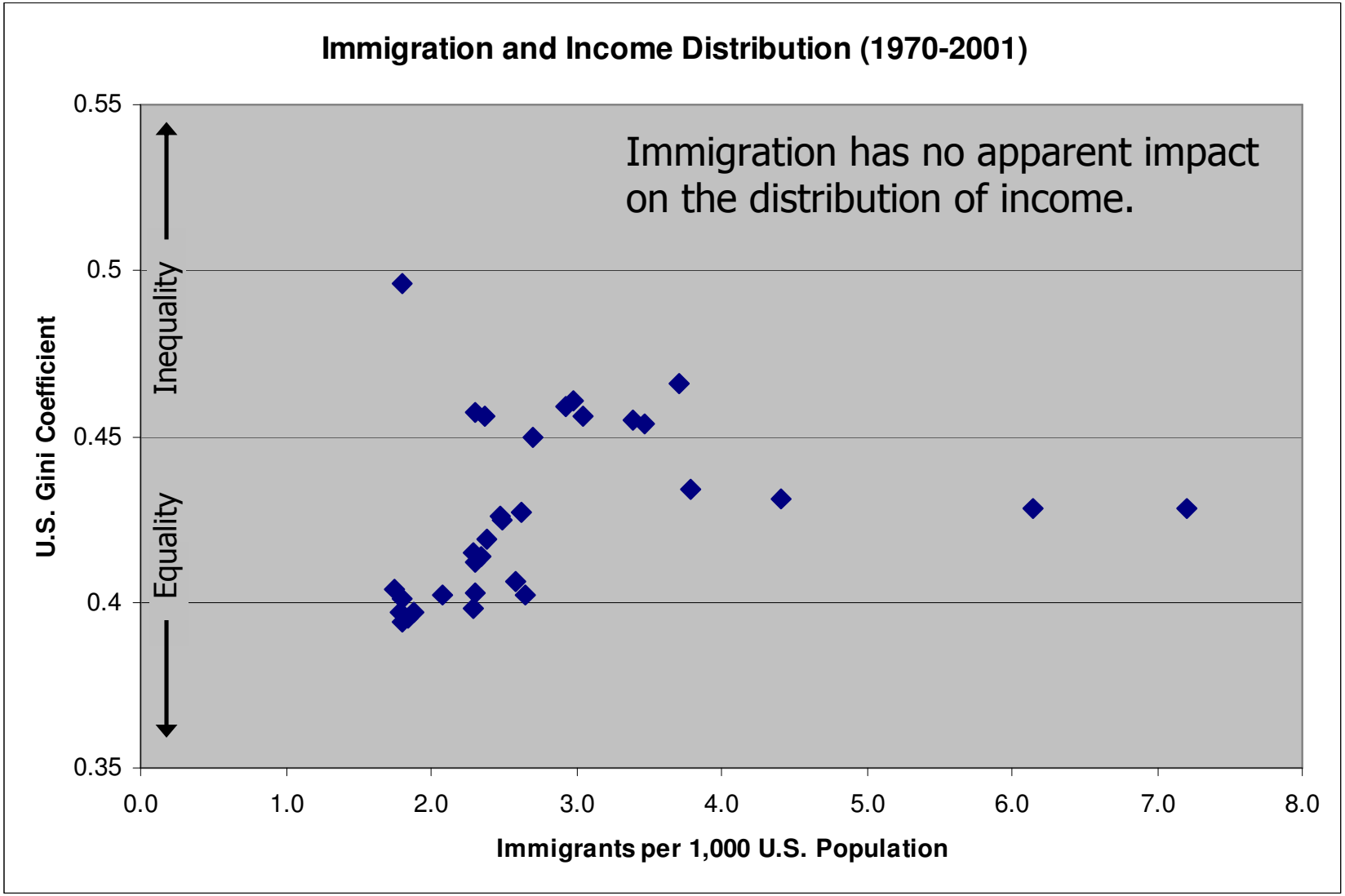
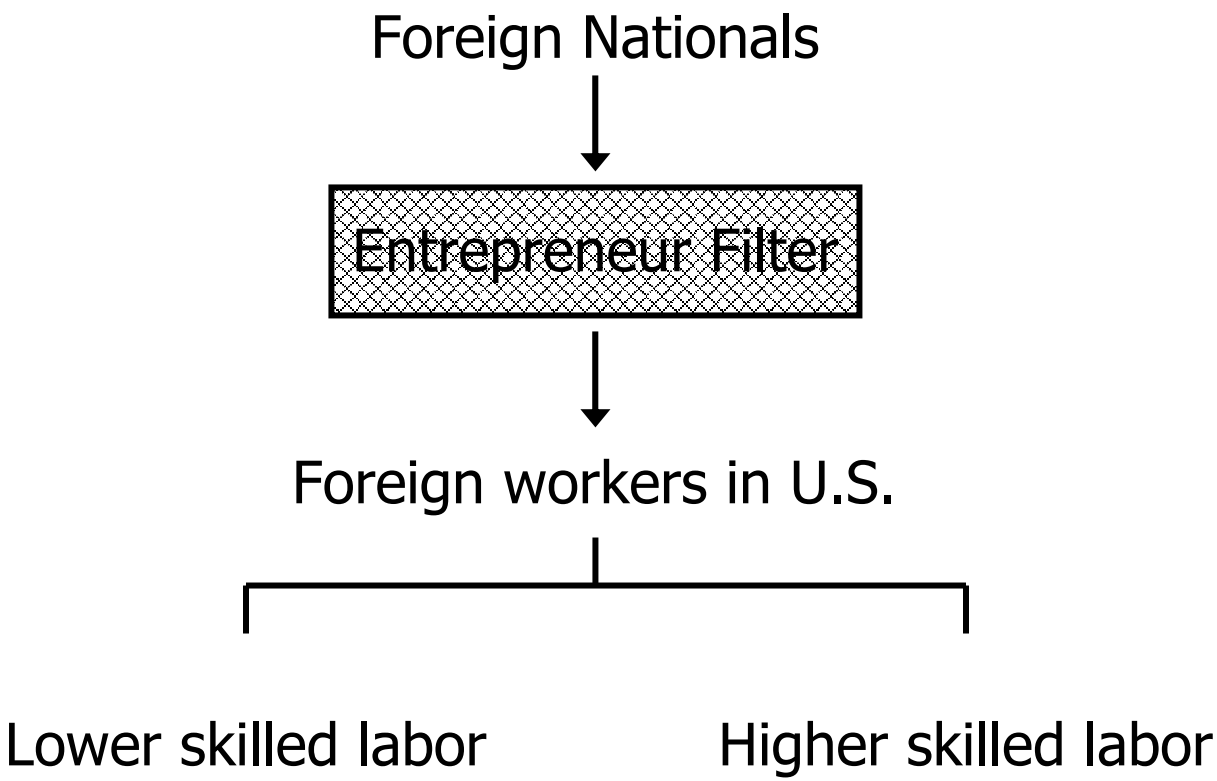


Source: *Current Population Survey, 2005*, Minnesota Population Center; *Statistical Abstract of the US*, Bureau of the Census.

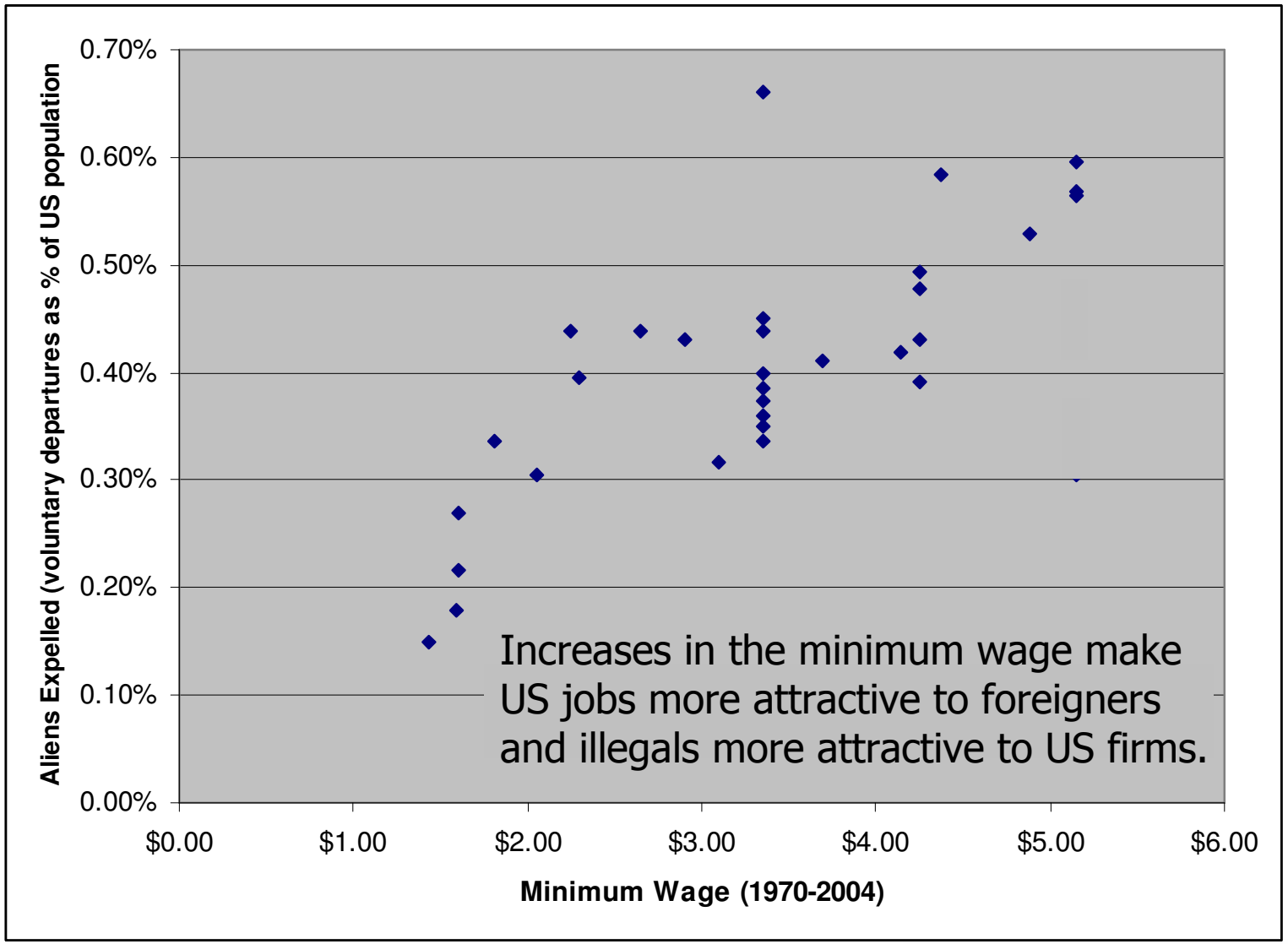
Immigration is a Filter



Some factors influencing influx of foreign lower skilled labor

- Supply effect: Increase in the minimum wage increases the attractiveness of U.S. jobs to potential immigrants.

- Demand effect: Increase in the minimum wage increases the attractiveness of illegal immigrants to U.S. firms.



Source: Department of Homeland Security and Bureau of Labor Statistics

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Some factors influencing influx of foreign higher skilled labor

- Supply effect: High quality of U.S. higher education attracts top foreign students who then want to stay on in the U.S.

  → Exported higher education is 3 times the value of exported steel and growing at 8% annually.

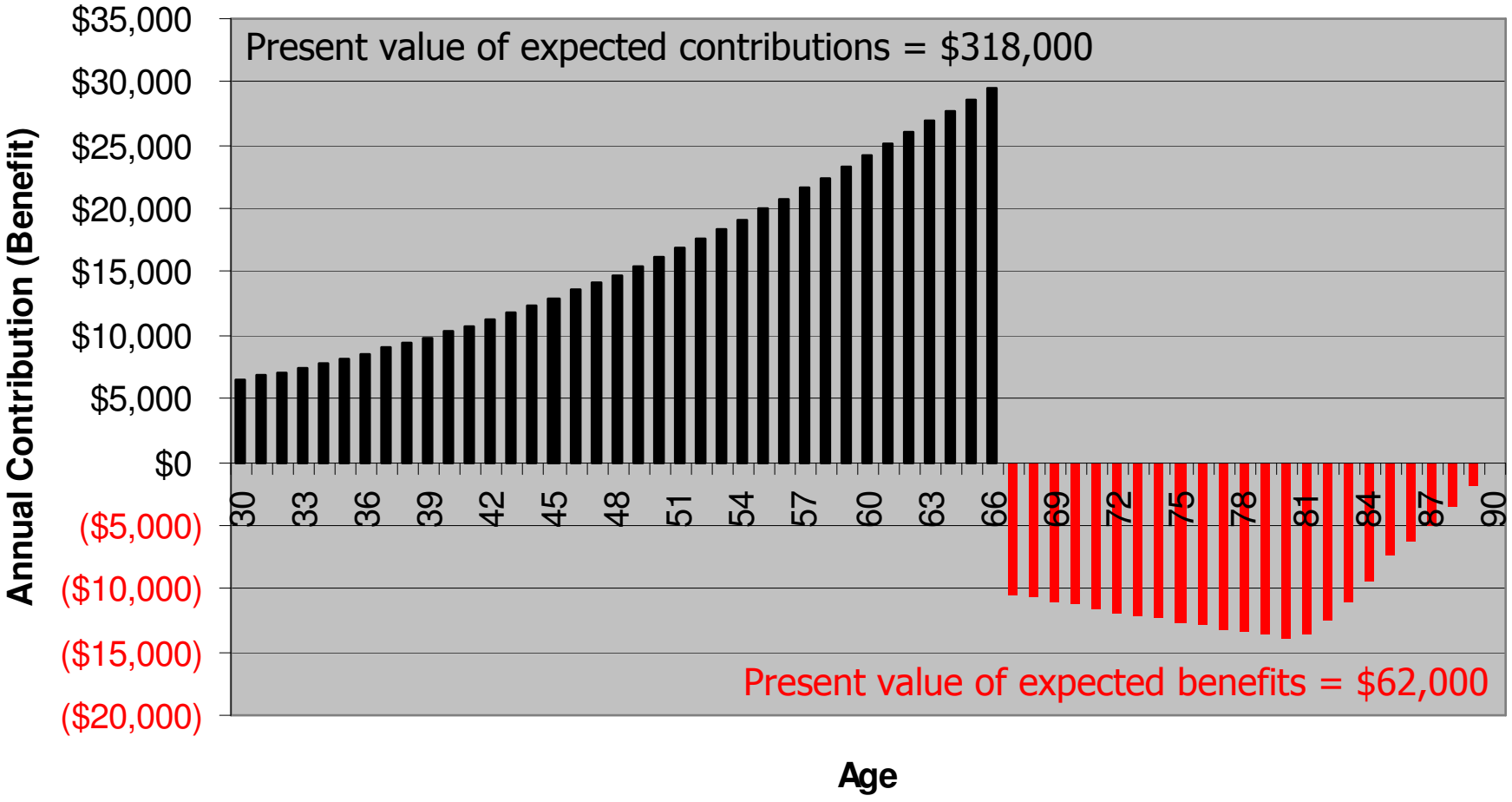
  → 75% of F-1 graduate students surveyed stated that they wanted to reside in the U.S. following their studies.

- Demand effect: Increases in technology require higher skilled workers for R&D and implementation.

  → Fiscal year 2008 quota of H-1B visas was reached in of April 2007.

What is the effect of H-1B approvals on Social Security?

Expected Impact on Social Security of Permanent Residency



Source: Office of Immigration Statistics, Department of Homeland Security; Statistical Abstract of the United States, Bureau of the Census; Social Security Administration

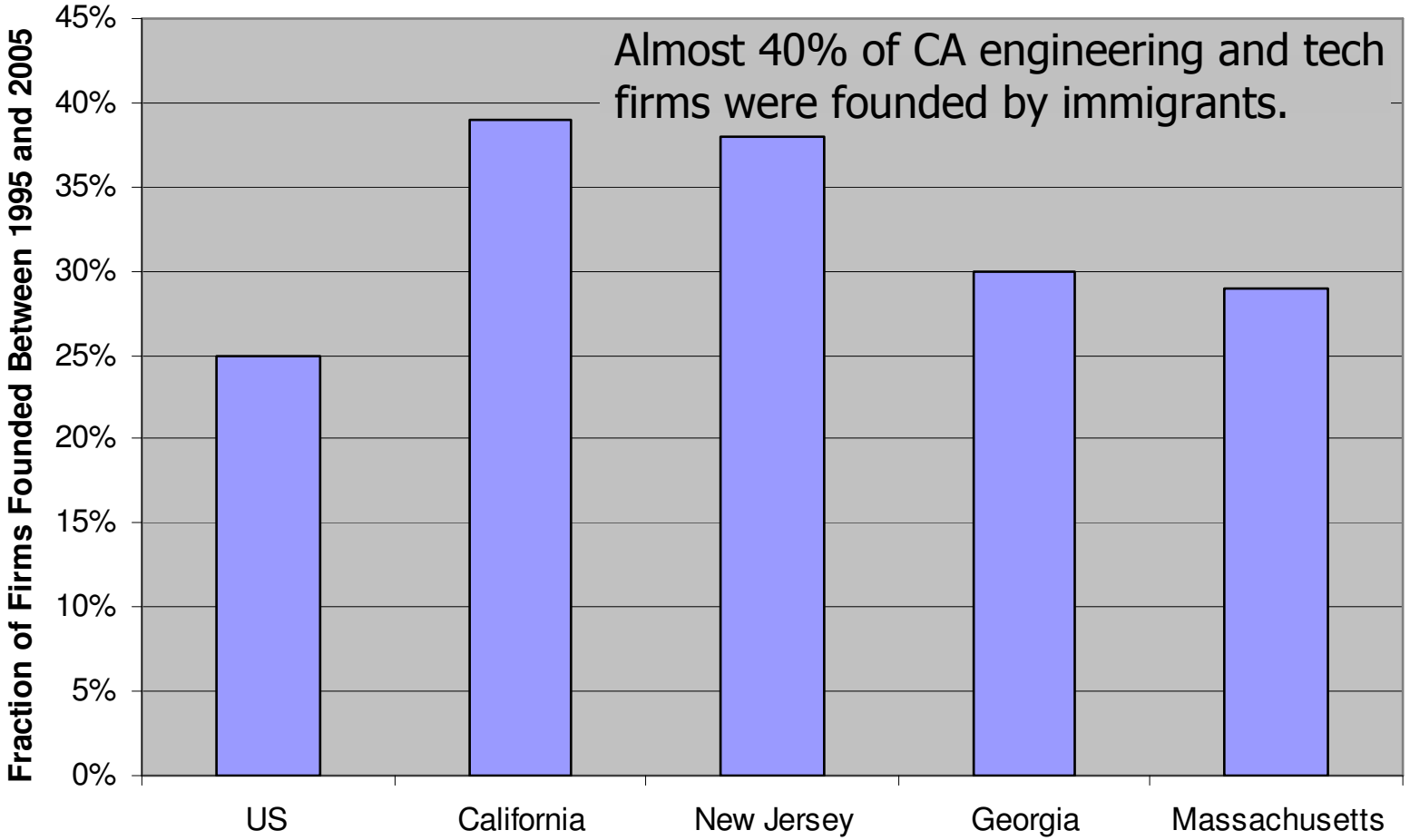
What is the effect of H-1B on Social Security?

The median H-1B who remains in the country contributes a net positive of more than $250,000 to Social Security (in present value terms).

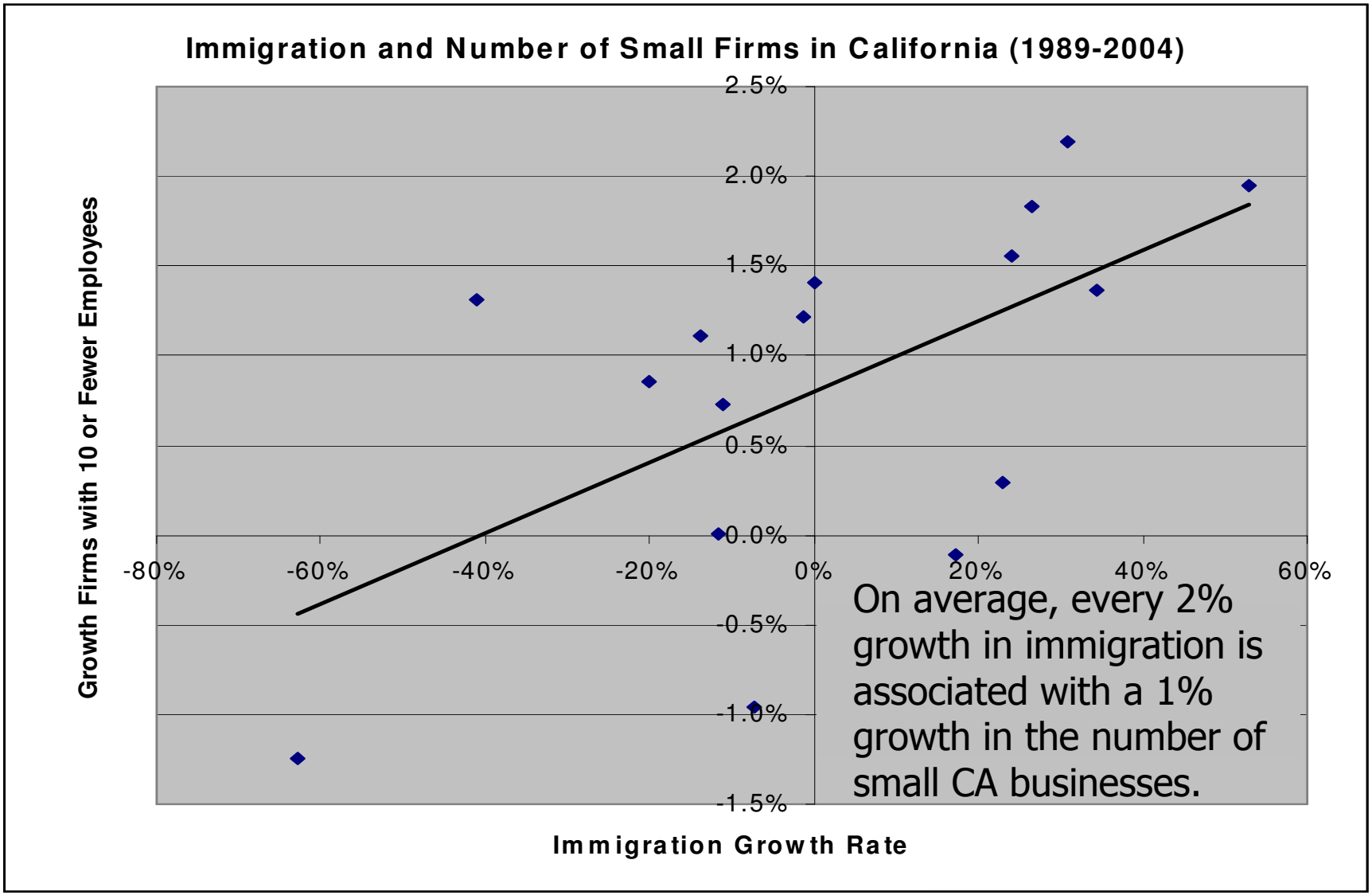
The median H-1B who leaves the country when the visa expires contributes a net positive of more than $50,000 to Social Security (in present value terms).

What do immigrant workers do besides work?

Engineering And Tech Firms For Which At Least 1 Founder Was Foreign-Born



Source: *America's New Immigrant Entrepreneurs*, UC Berkeley and Duke University, 2007.



Source: US Small Business Administration, Bureau of Labor Statistics.

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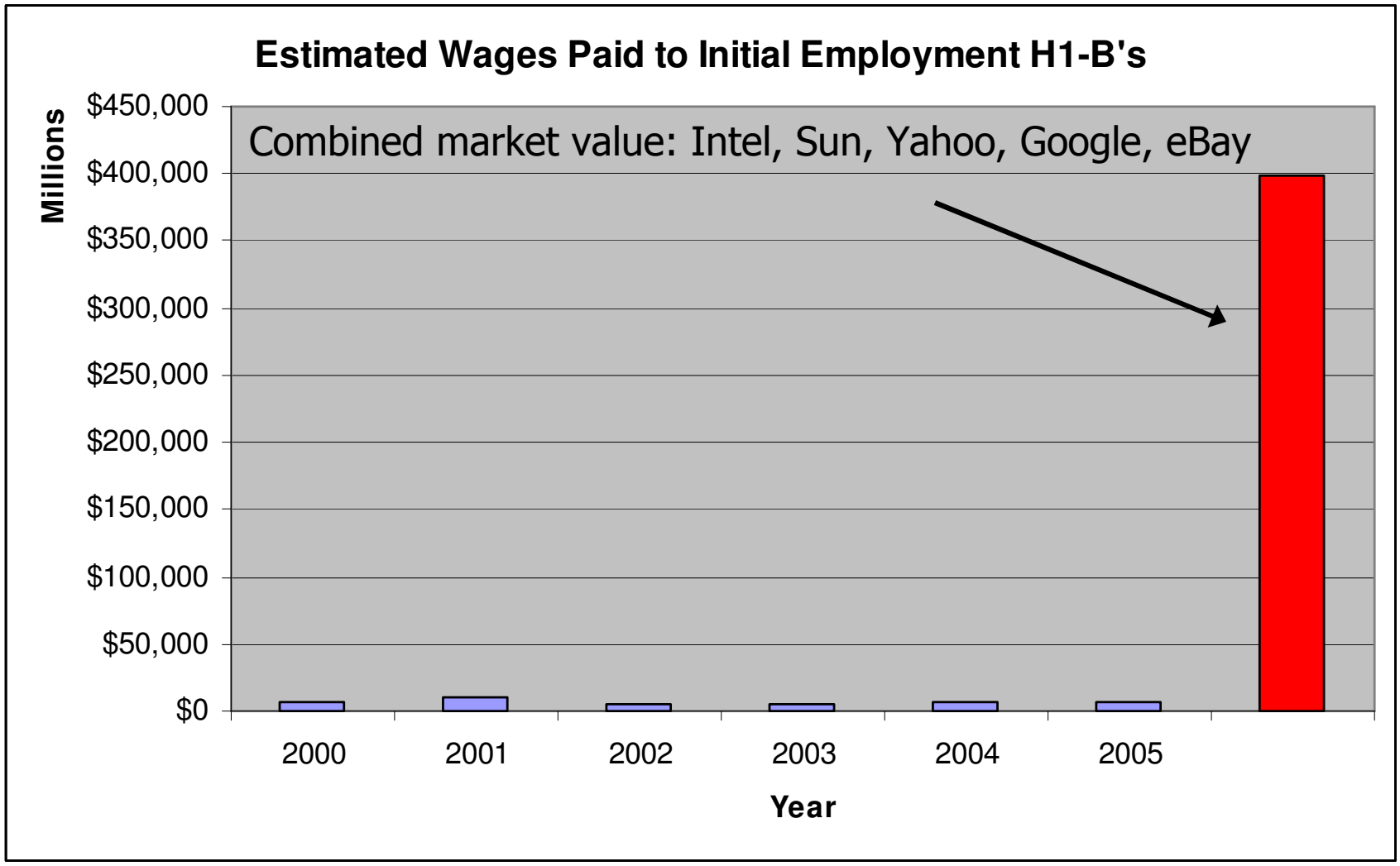
How much wealth do immigrants create?

Wealth created by H-1B's

Company	Founder	Country of Origin	Market Cap
Intel	Andy Grove	Hungary	$141 billion
Sun	Bechtolsheim/Khosla	Germany/India	$18 billion
Yahoo	Jerry Yang	Taiwan	$37 billion
Google	Sergey Brin	Russia	$160 billion
eBay	Pierre Omidyar	France	$43 billion



Source: Office of Immigration Statistics, Department of Homeland Security; SEC filings of the indicated companies

Immigration counteracts outsourcing.

Immigration counteracts outsourcing plus…

- Workers spend money directly in the US rather than importing from the US.

  → More consumption and improved tax base.

- There are "spillover" effects in the form of community involvement and enrichment.

  → Diversity.

- The children of educated immigrant labor will tend to become educated themselves and to remain in the U.S.

  → More educated populace.

Games Economists Play: Immigration

2007 Capital Campus California Retreat

September 28, 2007

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