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ABSTRACT

The economics of the decision to go to college or obtain technical training is discussed in this booklet. To stay competitive in the job market requires constant educational updating. The following questions are discussed: (1) how income inequality is measured; (2) how income is distributed in the United States; (3) why income inequality is increasing; and (4) how income inequality, unemployment rates, and welfare are related. Contains nine figures and a final quiz. (BT)

Income Inequality and the Education Divide.

by

Mary A. Welch

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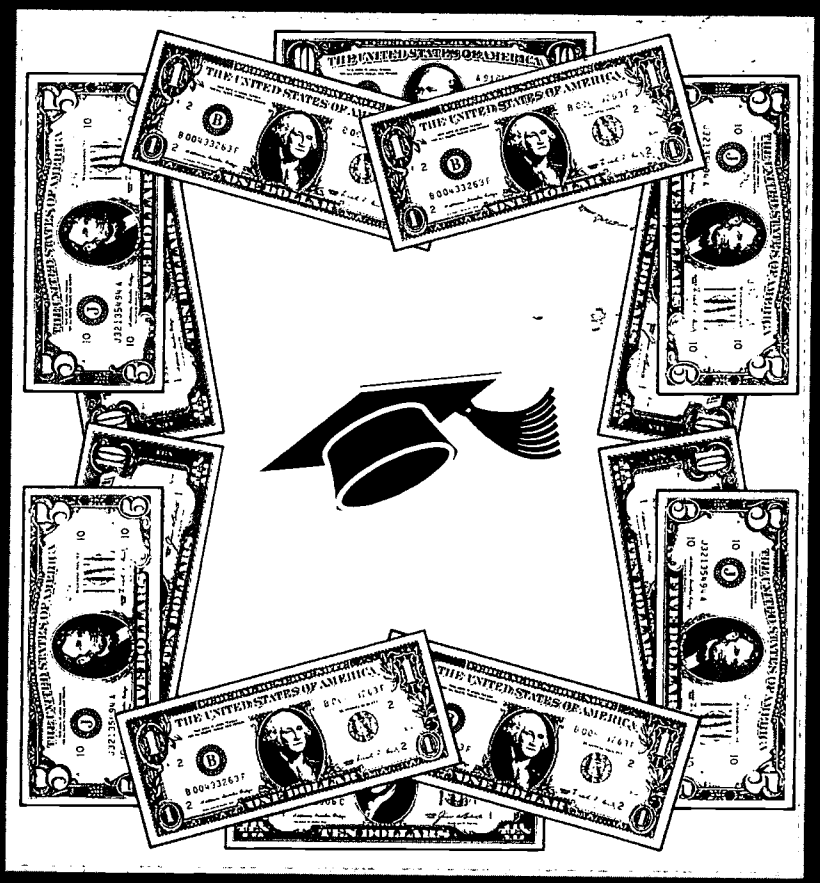
Economic Issues

for Food, Agriculture and Natural Resources

PURDUE UNIVERSITY SCHOOL OF AGRICULTURE FALL 1998, NO. 13



Income Inequality and the Education Divide

ECONOMIC ISSUES for Food, Agriculture and Natural Resources is published by the Office of Academic Programs, Mary A. Welch, editor. Fall 1998, No. 13.

A special thanks to Laura Hoelscher, Agricultural Communication Service, for her organizational and editorial assistance.

Income Inequality and the Education Divide

High-school graduates will be making economic choices all their lives, as bread-winners and consumers and as citizens and voters. A wide range of people will bombard them with economic information and misinformation for their entire lives. They will need some capacity for critical judgment. Quote of James Tobin, the 1981 Nobel Laureate in Economic Science.

As a student of economics, consider the very important decision that will have a large impact on your life–to continue your education or not to continue your education. This issue should help you make an informed choice.

We are at the beginning of the age of knowledge. Consider the following analysis by Sal Marino, Chairman Emeritus of Penton Publishing Inc.

My life span has embraced the change from buggy whips to spaceships. Speaking of life spans and change, it would require the lifetimes of nearly 770 people to span the last 50,000 years of human existence, assuming that a typical life span during that time was 65 years. Of those 770 people

- *600 would have spent their lives in caves or something less.*
- *Only the last 68 had any effective means of communicating with each other.*
- *Only the last six ever saw a printed word.*
- *Only the last four could measure time with precision.*
- *Only the last two used electric motors and*
- *Almost everything that makes up our material world today has been developed during the life span of the 770th person.*

The amount of microprocessor intelligence being manufactured keeps multiplying at a staggering rate. Put all this human and electronic brainpower together, and it positions us to do things that would have been considered miracles at the beginning of the 20th Century.

Knowledge is becoming a new source of power and wealth, and you have a chance to increase your share of it.

We used to think of getting an education as going to school, grades K-12, followed perhaps with a college degree or two or three. Now we must start thinking of school as K-80–in other words–a lifelong process. When the United States had an agricultural economy, people would go to school from age seven until about 14. That education was generally enough to last them through 40 years of their working life. In the industrial era, the age range of students expanded in both directions, from when they were five-year-olds until about 22. To stay competitive in the global job market, we must keep updating our education throughout our entire working lives. Graduating from high school is just a beginning.[1]

But how and why is getting and continuing to pursue an education important? Let's examine the economics of the decision to go to college or obtain some kind of technical training.

1 From *MINDShift: The Employee Handbook for Understanding the Changing World of Work*, by Price Pritchett. Used with full permission of Pritchett & Associates. 13155 Noel Road, Suite 1600, Dallas TX 75240, 1-800-9925922. All rights reserved

2 *Food System 21: Gearing Up for the New Millenium*, EC-710. *Food System 21:Key Questions for the New Millenium*, EC 711 (summary of the 15-chapter book). Media Distrubution Center, 301 South 2nd Street, Lafayette, IN 47901-1232, 1-888-EXT-INFO.

DOES EDUCATION PAY OFF?

Larry DeBoer, professor of agricultural economics at Purdue University, thinks an education does pay off. DeBoer and his colleagues in Purdue's School of Agriculture have completed a study of the future macroeconomic environment titled *Food System 21: Gearing Up for the New Millenium*.[2] In the macroeconomic chapter, DeBoer observes that the distribution of income is less equal today than it has been since World War II. The U.S. distribution of income is less equal than it is in European countries, though our unemployment rate is much lower. DeBoer points out that incomes are becoming less equal along the "education divide," meaning more educated, more skilled workers are gaining financially compared to less educated, less skilled workers. How do we know this, and what are the causes?

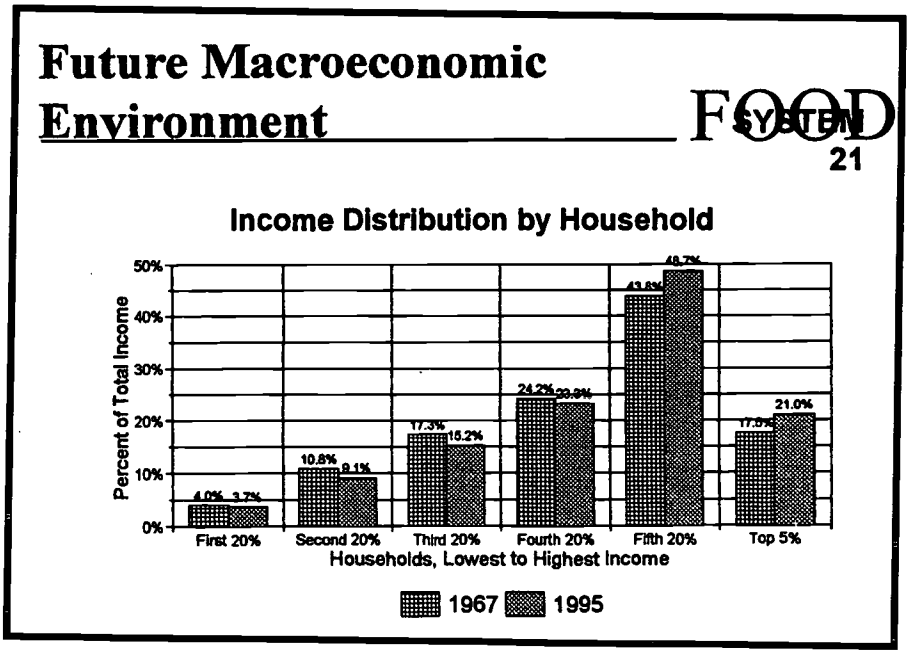


Figure 1

How Income Inequality Is Measured

Figure 1 shows the income distribution by household in 1967 compared to 1995. Imagine households in the United States lined up from the highest to lowest income. Imagine dividing this line into five parts and adding up the incomes of each fifth. The share of total income earned by the lowest 20% of income earners fell from 4.0 to 3.7% between 1967 and 1995. The shares of the second, third, and fourth 20% groups fell, too. However, the highest one-fifth of the population gained, and the most was gained by the top 5% of the earners. Thus, the distribution of income has become less equal since 1967.

Income Distribution in the U.S.

Inequality can be measured by computing a "gini index." The gini index ranges from zero to one. Zero means absolute equality: every family has the same income. With a zero gini index, the Donald Trumps and the Bill Gates would have the same income as the poorest homeless person on the streets of New York or Indianapolis. A gini index of one represents absolute inequality: only one family has all the income and everyone else has nothing.

Figure 2 shows the gini indexes for five different years between 1947 and 1994. Between 1947 and 1968, the distribution of income became more equal, but the trend is toward more inequality since 1968. An increase in the gini index represents a move toward less equality. Income distribution is less equal now than at any time since World War II.

Figure 2

Income Distribution in the United States by Year Measured with Gini Indexes

Year	Gini Index
1947	.376
1968	.348
1979	.365
1987	.393
1994	.426

International comparisons are often difficult to obtain, but Figure 3 compares gini indexes for Canada and Great Britain. The U.S. has a less equal distribution of income than that in most other developed countries. But elsewhere, income distribution is becoming less equal as well.

Gini Indexes Compared with Canada and Great Britain by Year.

	Canada	Great Britain	United States
1979	.331	.304	.365
1987	.353	.340	.393

Figure 3

Why Is Income Inequality Increasing?

There are demographic reasons for the increase in inequality–economics isn't everything! Since the 1960s there has been an increase in divorce and out-of-wedlock births. Single parent households tend to have lower incomes than two-parent households do, and with more of them, there are more lower-income households.

But economists tell us that there are powerful economic forces pushing the income distribution towards inequality. It appears that income inequality is increasing along the "educational divide." Figure 4 shows that in 1975, high school graduates earned on average $7,843 per year, while college graduates earned $12,332 annually, meaning that college graduates earned 57% more in real pay. In 1994, the average high school graduate earned $20,248, and the average college graduate earned $37,224, 84% more. Pay for high school graduates has gone up since 1975, but prices have gone up too. It's more expensive to buy just about everything. In fact, prices have gone up by more than the pay of high school graduates. This means that high school graduates can buy less in goods and services today than in 1975. Their "real pay"–measuring what they can buy with their wages–has actually gone down.

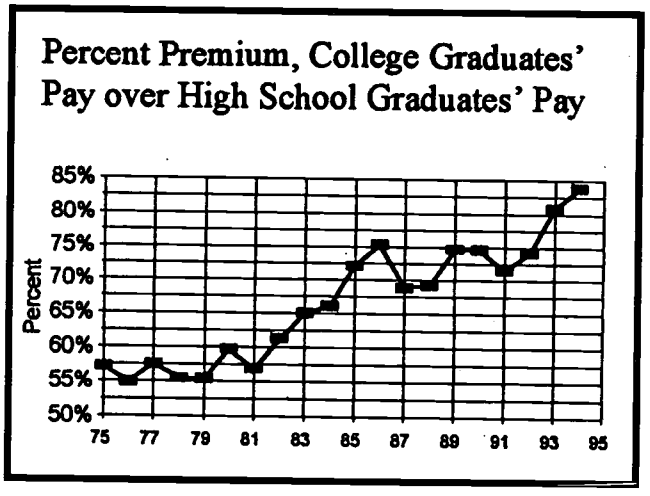
The gap between high school and college graduates pay is widening. The "return for having an education" is increasing. This is shown in Figure 5. The income advantage of college graduates has risen steadily over the past 20 years.

Figure 4

Average Pay of High School Grads and College Grads

	High School	College	Percent Premium
1975	$7,843	$12,332	57%
1994	$20,248	$37,224	84%
Real Pay (Deflated by the CPI)			
1975	$14,578	$22,922	57%
1994	$13,653	$25,101	84%

Figure 5



Why has the gap in pay widened relative to education? Why are skilled workers–such as software developers, doctors, engineers, and computer literate factory workers–earning more, while unskilled workers–such as dishwashers and fast food or cleaning service workers–earning relatively less? DeBoer and his associates offer two explanations.

Computer Technology

Information technology is increasingly important in the workplace. It may be that college graduates and more skilled workers generally know more about how to use this technology and are better at adapting to constant changes in technology. Figure 6 shows what happens when the demand for skilled employees increases while the demand for unskilled decreases (or at least increases less rapidly). Wages are shown on the vertical axis as "W," and the number of employees working is shown on the horizontal axis as "L." As technology improves, the demand for skilled labor increases, while demand for unskilled labor decreases. The wage gap grows.

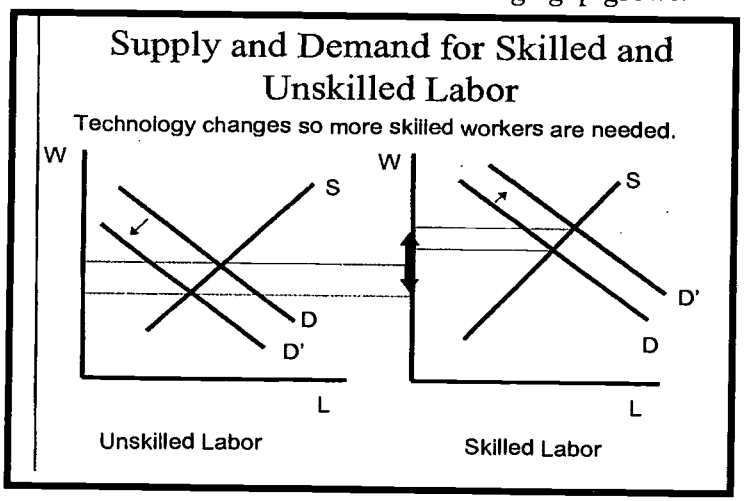


Figure 6

International Trade

A second explanation is that the United States has a comparative advantage in high technology goods–like computer chips, software, movies and video production, and airplanes–while many of our less developed trading partners have a comparative advantage in low technology goods–shoes, clothing, and simple manufactured goods like brooms and beanie babies.

Comparative advantage is discussed in more detail in ECONOMIC ISSUES #12, *Trade Is a Two-Way Street.* In this issue, comparative advantage shows the relative efficiency of each nation in producing goods. The United States cannot have a comparative advantage in producing all goods. The theme of this issue is "export what we do best and import the rest."

As trade increases, the U.S. has shifted production to high-tech goods, so the demand for educated, skilled high-tech workers has increased. We shift away from low-tech goods, and the demand for less-skilled, less-educated workers has decreased.

Some argue, DeBoer says, that the trade explanation doesn't match our experience. The demand for skilled workers has increased in all industries, not just high-tech industries. If it were merely a matter of the high-tech sector expanding and low-tech sector contracting due to trade, this wouldn't happen. In fact, if trade made skilled workers more expensive and unskilled workers less expensive, industries not involved in trade would increase their employment of unskilled workers. "They have not," DeBoer points out.

Therefore, economists like Dr. DeBoer think that advancing technology is probably the better explanation for rising inequality along the education divide. Increased trade is probably a lesser explanation.

How Are Income Inequality, Unemployment Rates, and the Welfare State Related?

To answer this question, it is helpful to compare the United States to Europe. Income inequality is much less in Europe than in the United States. However, unemployment rates are much higher in Europe than in the United States. Early in the 1970s, Europe was thought to have the unemployment problem solved, with an average unemployment rate of 2.7% in 1973. But as Figure 7 shows, today many European nations have unemployment rates in double digits, much higher than the rate in the United States, which is under 5% in the late 1990s.

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No. 13, Income Inequality and the Education Divide, Fall 1998

Due to vast changes in technology and jobs requiring greater skills, it is becoming an ever-more important decision whether to continue education beyond high school. Measures of income distribution show that more educated, more skilled workers are gaining financially compared to lesser-educated and skilled workers. Data are presented from a study of the future macroeconomic environment titled *Food System 21: Gearing Up for the New Millennium*, a product of the faculty in the Department of Agricultural Economics at Purdue University.

quantity_____

No. 12, Trade Is a Two-Way Street, Winter 1996/97

The United States cannot have a comparative advantage in producing all goods. As developing countries upgrade their physical and human capital, they will naturally have the capacity to be major suppliers of many goods. By restricting imports from these developing countries, we are not only raising prices to our consumers, we are limiting our exports of products in which we have a comparative advantage, in particular food and agricultural products. This issue supports the statement, "we should export what we do best and import the rest." These materials may be available in alternative formats (No. 12, 10 and 4)

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No. 11, The Cost of Keeping Up Appearances, Spring/Summer 1996

The issue discusses the development of an integrated pest management program developed at Purdue University for landscape professionals which allows pesticide materials to be applied only when the beauty of the landscape is endangered. Students will study the use of the Break-Even Point to illustrate making such a decision.

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No. 10, U. S. Export Advantage—Adding Value to Indiana's Exports, Fall 1995

U. S. agricultural exports are shifting from bulk grain and meal commodities to high-value fresh or frozen meat and poultry products. Find out what is causing this shift, what well-established and new world markets are emerging, and what this means for the food processing industry in the United States. These materials may be available in alternative formats (No. 12, 10 and 4).

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No. 9, Food Processing and Marketing—New Directions, New Opportunities, Spring 1995

Through a joint effort of economic analysis and technology, the dying tomato processing industry in the Midwest, which had lost a major comparative advantage to California, was revitalized. Discover how the process of aseptic processing allowed the tomato industry to greatly increase its economies of scale and become the most competitive in the world.

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A careful study of swine genetics and efficiency of production factors has helped producers select breeding stock to provide leaner meat without increasing production cost. This issue helps students understand the concept of net present value.

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No. 7, Strategic Marketing for Agribusiness, Winter 1993

By understanding the marketing planning process and the economics of consumer buying decisions, managers of food and agricultural businesses can make better decisions to help their businesses become more profitable. In a case study format, this issue helps students understand the concept of demand elasticity.

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No. 6, Economic Development for Communities, Winter 1992

Explore with students how successful economic development in a community involves an effort to export products and services to other communities, states, or nations and thus import dollars to the community.

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No. 5, Agricultural Chemical and Fertilizer Storage Rules—Costs and Benefits of Insuring Cleaner Water for Indiana, Fall 1991

Better understand costs of complying with regulations to ensure containment of chemical spills in relation to environmental costs. The concept of a public good is illustrated in this issue.

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No. 4, Economic Effects of Technological Advances in Agriculture, Fall 1990

A better understanding of agricultural economic concepts helps Americans become better food buyers, be more knowledgeable about food values, and appreciate their relatively cheap, high-quality food supply. Study how the use of biotechnology has microeconomic implications for the animal industries and consumers. Supply and demand curves illustrate the determination of the pork price, and quantities produced and consumed as a result of one biotechnical development in the swine industry. These materials may be available in alternative formats (No. 12, 10 and 4).

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No. 3, International Trade in a Global Environment, Spring 1990

Many factors affecting U.S. trade are beyond our control. However, the United States and its citizens do control macro economic policy, trade policy and domestic farm policy. Market, command and traditional economies, opportunity cost, along with other trade concepts including GATT (General Agreements on Trade and Tariffs), are discussed.

quantity_____

No. 2, Commodities Trading—An Essential Economic Tool, Fall/Winter 1989-90

This issue discusses the use of *commodities trading* (futures contracts and options) as an important economic tool to benefit both buyers and sellers in today's agricultural and natural resources marketing environment.

quantity_____

No. 1, Value Added–Adding Economic Value in the Food Industry, Spring 1989
The concept of *value added* is discussed using the pork product, sausage, to add value by making frozen pizzas. Questions discussed include jobs created by value added processes and using value added to calculate *Gross Domestic Product.*

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Unemployment Rates of the United States Compared to Europe by Year		
Unemployment Rates	United States	Europe
1973	4.9	2.7
1997	4.9	10.4

Figure 7

Many economists suggest that socioeconomic reasons account for the difference between the United States and Europe. Europe supports a much more generous welfare state, while the United States has a much less generous welfare state.

Figure 8 shows the share of Gross Domestic Product which are transfer payments–shifts in income from one group to another, like Social Security, welfare, and unemployment insurance–for the U.S. and three other industrialized countries.

Transfer Payment percent of GDP United States' Percent of Gross Domestic Product Used for Transfer Payments Compared to Three Other Industrialized Countries.	
United States	9.4%
Canada	12.3%
Great Britain	24.3%
Sweden	35.5%

Figure 8.

The United States has one of the least generous welfare states and spends less on social welfare programs than do most developed countries.

The "reservation wage" may explain some of this phenomenon at work. The reservation wage is a dollar (or mark or pound or franc) amount below which few people will work. It is different from the minimum wage, although the minimum wage may influence it. This concept would depend on people's attitudes about what is fair, what they deserve, and how well they expect to be able to live. In Europe, big welfare states mean not only generous

high unemployment insurance, many weeks of mandatory paid vacation, paid maternity and paternity leave, and so forth.

A large welfare state tends to raise people's reservation wages. If people can be unemployed but receive livable income and health benefits, they may not be willing to work at low wages.

In the United States, we have a less generous welfare state. Our welfare payments are low; we have limited unemployment insurance and little government health insurance. Even the minimum wage is about $2.00 an hour less than what is takes to reach the poverty level working full time. So in the United States, unemployment is quite uncomfortable. Working, even at a low wage, is preferred. In the United States, reservation wages are lower because the cost of unemployment is high.

What happens when technology pushes up the demand for skilled labor and pushes down the demand for unskilled labor as seen in Figures 9a and 9b?

Figure 9a

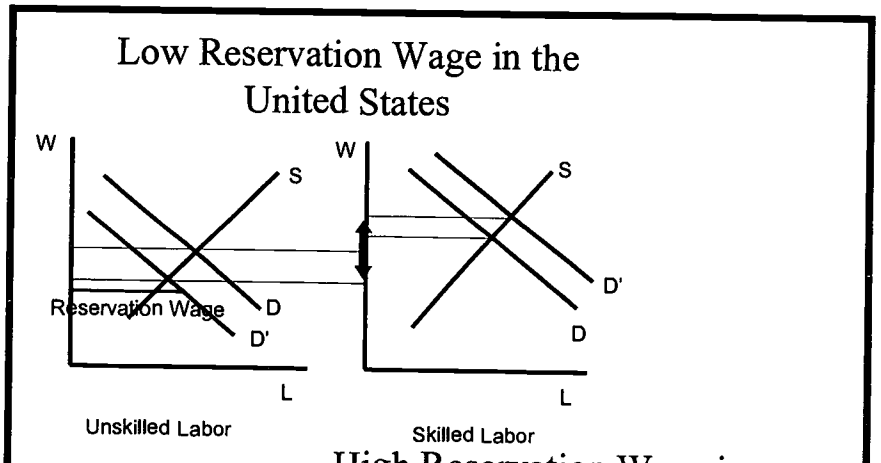
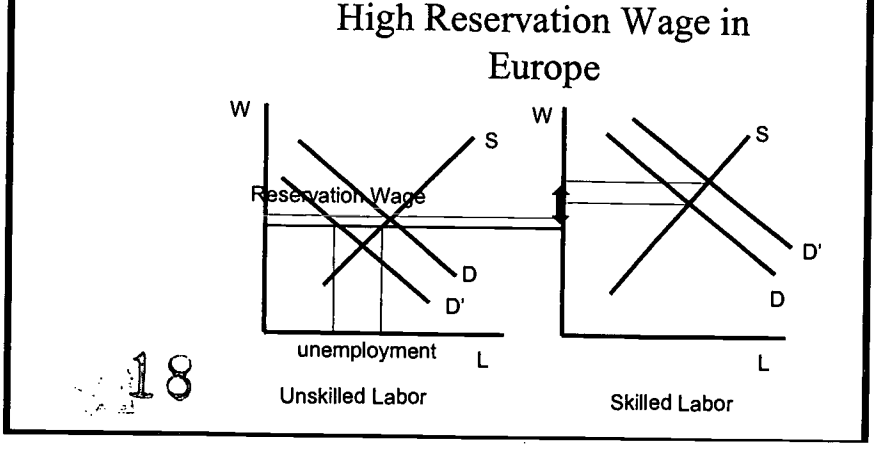


Figure 9b



In the United States, the differential between skilled and unskilled pay increases. Nothing much happens to unemployment as long as unskilled wages are above the low reservation wage.

In Europe, as unskilled labor demand declines, the reservation wage is reached. People will not work at wages below this. Government supports their incomes at around this level. Compared to the U.S., the difference between skilled and unskilled pay is less, but there is high unemployment–the number of unskilled workers supplied is more than the number demanded. In the U.S., unskilled pay is allowed to fall, so the difference between skilled and unskilled wages is greater, but there is not as much unemployment.

Citizens and policy makers have a choice over what to do about the effects of advancing technology. They can choose to support a big welfare state to keep the income distribution more equal. But the result is higher unemployment. Or, they can choose a smaller welfare state. This keeps unemployment low, but allows income inequality to increase. Thus it appears that national policies to address the problem caused by advancing technology must result in either increased inequality of income or increased unemployment. But individuals can avoid this tradeoff by getting more education, and winding up on the favorable side of the education divide.

SUMMARY

With the vast changes in technology and jobs requiring greater skills, it is becoming an ever-more important decision whether to continue education beyond high school. Measures of income distribution show that more educated, more skilled workers are gaining financially compared to lesser-educated and skilled workers. Statistics indicate that college graduates are earning ever-higher incomes per year than high school

graduates. And over the past 20 years, the premium for having a college degree has steadily increased from 55% to 84%.

The increasing demand for skilled, educated employees who can handle advancing technology is increasing their pay. The decreasing demand for less skilled employees is decreasing their pay. This is the main explanation for increasingly unequal incomes in the United States. Increased trade, which causes a shift toward high-tech production, may be another explanation.

Europe's big welfare states mean that the incomes of unskilled workers have not fallen as much as they have in the U.S. But this has decreased the demand for such workers, increasing unemployment. In a sense, the higher unemployment rates in Europe and the increasing income inequality in the U.S. are two sides of the same coin–the education coin.

"If I am interested in this topic, what career opportunities are available to me with a degree from the School of Agriculture?"

There are widespread opportunities for professionally trained business people and economists to research, analyze, manage, and communicate technological advances. Trained agricultural economists live in large cities and small towns and work for large corporations, small businesses, universities, state and federal government, radio and television stations, and professional organizations. They develop new markets and sell products; manage businesses; analyze markets and prices; research new technologies; and write and teach about them. In fact, agricultural economists find a multitude of opportunities for employment in the food, agricultural, and natural resource systems in the United States and in countries throughout the world.

Larry DeBoer is a professor and extension specialist in Agricultural Economics at Purdue University. He studies state and local government public policy, including such topics as government budget and taxing options, issues of property tax assessment, local government revenue options, and the fiscal impact of ecomomic development. He directs the staff work for the Citizen's Commission on Taxation, the group established by the Governor to study tax reform in Indiana. He directed a study on market value property tax assestment for the Indiana State Board of Tax Commissioners during 1995-97. He also works with the Indiana Legislative Services Agency on tax and finance issues, including the annual state revenue forecasts. He writes the macroeconomic outlook section of the Agricultural Economics Department's annual outlook program. He teaches an undergraduate course in macroeconomics. Professor DeBoer's innovative teaching style led him to develop such lectures as "Economics of Rock 'n Roll" and "Economics of *The Wizard of Oz*."

QUIZ

1. What is the main reason that incomes are becoming less equally distributed?

A. International trade is decreasing, which is throwing many people out of work.

B. Government is increasing its spending on welfare, unemployment insurance, and health insurance, which is increasing the reservation wage.

C. Technology is increasing the demand for the skilled workers and decreasing the demand for unskilled workers.

D. Technology is increasing the number of computers, which are replacing workers and reucing their wages.

2. Why is the income distribution in Europe more equal than in the U.S., while the unemployment rate is higher?

A. The demand for unskilled labor is increasing in Europe, so the gap between skilled and unskilled wages is smaller.

B. The large European welfare states keep unskilled wages from falling, but reduce the number of jobs for unskilled workers.

C. The large European welfare states cause the supply of skilled labor to be higher in Europe than in the U.S.

D. In international trade, the U.S. exports unemployment to Europe, while Europe exports income inequality to the U.S.

3. How can the difference between the "minimum" wage and "reservation" wage best be explained?

A. The reservation wage depends on people's attitude–"It does not benefit me to work; I can make more by collecting welfare."

B. There is no difference. The reservation

wage and minimum wage are so close, the difference cannot be measured.

C. The more generous welfare states of Europe allow the reservation wage to be higher than in the U.S.

D. Both A and C are correct.

E. None of the above are correct.

4. What best explains the meaning of the phrase "education divide"?

A. The richest people in the world, on the average, can afford more education.

B. Studies show that there continues to be a trend for college graduates to earn more in a lifetime than high school graduates.

C. The income advantage for college graduates rose over 35% between 1975 and 1994.

D. B and C are both correct.

E. None of the above are correct.

5. Which of the following may impact the increasing inequality of incomes in the world?

A. More children are being born out of wedlock.

B. The United States has a comparative advantage in high-technology goods.

C. The increased use of computers in the workplace requires more skilled labor.

D. All of the above may contribute to the increasing unequal distribution of incomes.

E. None of the above could have an impact on the gini index.

6. Why is getting and continuing an education more important today than it was 100 years ago?

A. The industrial revolution created more technical jobs, which require more literate workers.

B. Income inequality is widening in favor of those who have an education beyond high school.

C. Unemployment is lower in the United States than in Europe, thus education is necessary to catch up with the Europeans.

D. A and B are both correct.

E. None of the above are correct.

True/False

_____7.. In a large welfare state, the reservation wage tends to decline.

_____8.. The best explanation of lower unemployment rate in the U.S. is that more people are able to work because of a high reservation wage.

Answers:
1-C,2-B,3-D,4-B,5-D,6-D,7-F,8-F

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