**Problem Set 1**

1. Consider the following data for the United States for years 1980–2006.

**Labor Force Participation Data for U.S. for 1980–2006**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **year** | **CLFPRM** | **CLFPRF** | **UNRM** | **UNRF** | **AHE82** | **AHE** |
| 1980 | 77.4 | 51.5 | 6.9 | 7.4 | 7.99 | 6.84 |
| 1981 | 77 | 52.1 | 7.4 | 7.9 | 7.88 | 7.43 |
| 1982 | 76.6 | 52.6 | 9.9 | 9.4 | 7.86 | 7.86 |
| 1983 | 76.4 | 52.9 | 9.9 | 9.2 | 7.95 | 8.19 |
| 1984 | 76.4 | 53.6 | 7.4 | 7.6 | 7.95 | 8.48 |
| 1985 | 76.3 | 54.5 | 7 | 7.4 | 7.91 | 8.73 |
| 1986 | 76.3 | 55.3 | 6.9 | 7.1 | 7.96 | 8.92 |
| 1987 | 76.2 | 56 | 6.2 | 6.2 | 7.86 | 9.13 |
| 1988 | 76.2 | 56.6 | 5.5 | 5.6 | 7.81 | 9.43 |
| 1989 | 76.4 | 57.4 | 5.2 | 5.4 | 7.75 | 9.8 |
| 1990 | 76.4 | 57.5 | 5.7 | 5.5 | 7.66 | 10.19 |
| 1991 | 75.8 | 57.4 | 7.2 | 6.4 | 7.58 | 10.5 |
| 1992 | 75.8 | 57.8 | 7.9 | 7 | 7.55 | 10.76 |
| 1993 | 75.4 | 57.9 | 7.2 | 6.6 | 7.52 | 11.03 |
| 1994 | 75.1 | 58.8 | 6.2 | 6 | 7.53 | 11.32 |
| 1995 | 75 | 58.9 | 5.6 | 5.6 | 7.53 | 11.64 |
| 1996 | 74.9 | 59.3 | 5.4 | 5.4 | 7.57 | 12.03 |
| 1997 | 75 | 59.8 | 4.9 | 5 | 7.68 | 12.49 |
| 1998 | 74.9 | 59.8 | 4.4 | 4.6 | 7.89 | 13 |
| 1999 | 74.7 | 60 | 4.1 | 4.3 | 8 | 13.47 |
| 2000 | 74.8 | 59.9 | 3.9 | 4.1 | 8.03 | 14 |
| 2001 | 74.4 | 59.8 | 4.8 | 4.7 | 8.11 | 14.53 |
| 2002 | 74.1 | 59.6 | 5.9 | 5.6 | 8.24 | 14.95 |
| 2003 | 73.5 | 59.5 | 6.3 | 5.7 | 8.27 | 15.35 |
| 2004 | 73.3 | 59.2 | 5.6 | 5.4 | 8.23 | 15.67 |
| 2005 | 73.3 | 59.3 | 5.1 | 5.1 | 8.17 | 16.11 |
| 2006 | 73.5 | 59.4 | 4.6 | 4.6 | 8.23 | 16.73 |

**CLFPRM**: Civilian labor force participation rate, male (%),

**CLFPRF**: Civilian labor force participation rate, female (%),

**UNRM:** Civilian unemployment rate, male (%)

**UNRF**: Civilian unemployment rate, female (%),

**AHE82**: Average hourly earnings (1982 dollars),

**AHE:** Average hourly earnings (current dollars).

1. Plot the male civilian labor force participation rate against male civilian unemployment rate. Comment.
2. Repeat (a) for females.
3. Now plot both the male and female labor participation rates against average hourly earnings (in 1982 dollars). (You may use separate diagrams.) Now what do you find? And how would you rationalize your finding?
4. Following data is on expenditure on food and total expenditure, measured in rupees, for a sample of 55 rural households from India. (In early 2000, a U.S. dollar was about 40 Indian rupees.)

a. Plot the data, using the vertical axis for expenditure on food and the horizontal axis for total expenditure, and sketch a regression line through the scatter points.

b. What broad conclusions can you draw from this example?

|  |  |
| --- | --- |
| **food\_expenditure** | **total\_expenditure** |
| 217 | 382 |
| 196 | 388 |
| 303 | 391 |
| 270 | 415 |
| 325 | 456 |
| 260 | 460 |
| 300 | 472 |
| 325 | 478 |
| 336 | 494 |
| 345 | 516 |
| 325 | 525 |
| 362 | 554 |
| 315 | 575 |
| 355 | 579 |
| 325 | 585 |
| 370 | 586 |
| 390 | 590 |
| 420 | 608 |
| 410 | 610 |
| 383 | 616 |
| 315 | 618 |
| 267 | 623 |
| 420 | 627 |
| 300 | 630 |
| 410 | 635 |
| 220 | 640 |
| 403 | 648 |
| 350 | 650 |
| 390 | 655 |
| 385 | 662 |
| 470 | 663 |
| 322 | 667 |
| 540 | 680 |
| 433 | 690 |
| 295 | 695 |
| 340 | 695 |
| 500 | 695 |
| 450 | 720 |
| 415 | 721 |
| 540 | 730 |
| 360 | 731 |
| 450 | 733 |
| 395 | 745 |
| 430 | 751 |
| 332 | 752 |
| 397 | 752 |
| 446 | 769 |
| 480 | 773 |
| 352 | 773 |
| 410 | 775 |
| 380 | 785 |
| 610 | 788 |
| 530 | 790 |
| 360 | 795 |
| 305 | 801 |

1. During an investigation in an agricultural farm, the length (in cm) of green jute plants and weight of dry jute fibre were observed for 350 plants.

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| **Weight of dry jute plants(gm)** | **Length of green jute plant(cm)** |
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1. Plot the data and comment on your findings.
2. Which variable will you take as the dependent one and which one will you consider as the independent one?
3. Considering the population of the 350 plants, fit a regression equation and comment.
4. Draw two independent samples of sizes 50 and 100 and plot the data and find the regression equations corresponding to both the samples.
5. Plot all the three regression equations on the same graph and Comment on your overall findings.