Social Security started in 1935 in Great Depression. Asset values had fallen drastically, many elderly lost their lifetime savings.

Workers pay tax on earnings, money from tax is put in a trust fund, invested in government bonds. (A trust fund is like a bank account). The income from the account is paid to those eligible for SS benefits.

Eligible are retirees at least 62 years old, surviving spouses and children under 18. There is also a broader program which covers disabled of any age. The same payroll tax pays for both retirees and disabled.

For the pension part of SS, must have worked and paid payroll tax for 10 years and be 62 or older. Can you work and get SS? Yes - Workers 62 to 64 have their benefits reduced by 0.50 for each dollar of earnings over $12480. These reduced benefits get paid back later, actuarially adjusted, when the worker’s earnings fall below the threshold. For workers above 65, they can claim benefits and earn as much as they want.

SS is financed by a payroll tax. Almost all workers in the US who are not self-employed pay the Federal Insurance Contributions Act (FICA) tax on earnings (the self-employed pay SE, which is a similar payroll tax and goes to the same fund). The tax rate is 6.2% on the first 102,000 of pre-income-tax earnings. Also employers pay a 6.2% tax on the same earnings, so it ends up being a 12.4% tax.

Any person eligible for SS then gets an annuity payment, paid every month until death.

The amount of benefits depends on lifetime earnings. Specifically, on the 35 highest-earning years of income. To calculate benefits, the lifetime earnings are adjusted for both inflation, using CPI, and for the increase in productivity levels that occurs over time. The computed average of real adjusted monthly earnings is called Average Indexed Monthly Earnings (AIME).

There is a formula that transforms an individual’s AIME into benefits. The benefit system is progressive - people with lower earnings get a greater fraction of their earnings as benefit than people with higher earnings do. For AIME less than $612/month, 90% benefits are received; for AIME of $656 to $3955, only 32%, for 3955 to 6316, 15%.

The payroll system is regressive, meaning that richer people pay a lower percentage of their income than poorer people.

The net benefit received, if you look at the formulas, is progressive. In reality, though, when you look at the benefits given and the payments made, the whole system is only slightly progressive. The main reason for this is that richer people
live longer, so they receive more SS benefits than the poor.

The replacement rate measures the generosity of the SS system. It equals the ratio of benefits received to preretirement earnings (if retirement was the event that entitled a person to SS). The average person’s replacement rate is 40%, the average low-income person’s replacement rate is 60% and the average high-income person’s is 20%.

Differences between SS, private pensions and private annuities.

Private pensions, annuities, saving could all be viewed as alternatives to SS.

Private pensions and annuities both provide insurance against low consumption. Private pensions are usually provided by an employer. Holders of the pension pay in a certain amount until they retire, at which point they receive payments until their death. Annuities are bought by a private individual. A payment is made by the individual, in exchange for which the annuity company pays the individual a stream of payments from a certain time until their death.

Private saving provides the consumption-smoothing over time aspect of SS, but not the insurance across different state aspect of SS.

To talk about the benefits a consumer receives from either private pensions or social security, the following equation is helpful.

Let \( b_t \) equal the benefit received in period \( t \) and \( c_s \) the payment made in period \( s \). PDV of net benefits equals \(-\sum_{t=0}^{t^*} \frac{b_t}{(1+r)^t} + \sum_{t=t^*+1}^{T} \frac{b_t}{(1+r)^t}\), where \( t^* \) is the period where the last payment is made (retirement) and \( T \) is the last period alive. If this expression is zero, then the insurance contract is actuarially fair. In that case, the seller of insurance (who is risk-neutral) breaks even, and the buyer (who is risk-averse) gains.

Funded versus unfunded plans.

In funded plans, savings are invested in assets - gov bonds, corp bonds or stocks. Accumulated assets and current earnings of the company fund the benefits in the future promised by the pension. Annuities and private pension plans are funded.

In unfunded plans, taxes collected from a worker today go directly to today’s retirees. Called pay-as-you-go.

SS is a partially funded plan. The gov collects more in the taxes earmarked for SS than they are paying out (now). It invests the SS surplus in government bonds. In the future, there is expected to be a SS deficit. The trust fund that holds excess SS money is expected to run out by 2042. Then the plan will be unfunded (if system is not changed).

There is risk in an unfunded or in a funded plan. For SS, the policy could change to reduce benefits, in such a way that some generation gets less in benefits than they paid in. For a funded plan, the assets invested in could lose value, so that there is little left to pay pension holders.
Many of the non-self-employed covered by SS also have private pensions through their employer. The employer chooses a set of possible pension plans, the employee can choose among them.

Why do people have private pension in addition to SS?

They want more insurance against low income in old age than social security provides.

They could just buy assets (save) on their own. Why do they get a pension from their employer?

Historical reason: a tax advantage when you buy into a pension fund. Income earned on the interest from the pension is tax free (though now there are many other tax-free ways to save).

Another reason: pooling risk to the insurer of insured living long. When a group of employees has a pension fund together, the adverse selection effects are reduced. Also, the average net payment to the pensioners will be closer to the expected net payment from the point of view of the pension firm.

Another historical reason: By having a big fund, reduce the transaction costs and can have a diversified portfolio. This reason has somewhat disappeared because there are now mutual funds which also pool investment risks and reduce the transaction costs.

Defined benefit versus defined contribution. Defined benefit means there is a formula for the benefits which depends on how much people pay in. SS is a defined benefit system. Typically defined benefit plans are partially funded. Defined contribution means that workers and their employer pay in a fixed fraction of their earnings and the benefits are some share of the return to the assets (for example if an asset appreciates, the worker gets a share of that appreciation). Defined contribution plans are funded.

Potential problems with the above-mentioned reasons for buying into a pension plan in addition to SS:

Compare private pension to private saving and to SS. Private savings is a defined contribution plan. Pensions are also a defined contribution plan. But they are different. Pension forces you to contribute a certain percentage (like SS). Thus, private saving has flexibility. But with a pension, you gain the group diversification and group insurance over lifetime. Now the group diversification benefit has almost disappeared. But the group insurance over lifetime is still a major benefit.

(There is a huge adverse selection problem in the private annuity market. It is very complicated to estimate an actuarially fair rate for private annuity. The people who buy annuities are either expecting to live very long or extremely risk-averse.)

A difficulty with pensions: some employers don’t diversify that much (company
has some control over which assets are bought, they typically want their own stock to be bought). When it looks like a company will go bankrupt, workers have to choose between lending company their own stock (it could go bankrupt anyway) and going bankrupt. This aspect adds risk to buying pensions in many companies.

Defined benefit plan might seem more secure. But the company can be less viable in this case if it earns less, it still has to pay fixed amount in benefits.

Government is much more sure of surviving than any private company. This is one advantage of SS over any kind of private pensions.

A problem with SS - legacy debt.

There was a first generation who received SS. This generation had made only very small payments into the SS system (the gov started by collecting taxes towards the end of the Great Depression for SS, but the tax rate was very low). The debt due to payments made to this first generation is called a legacy debt. There is also interest on that debt that must be paid (this debt is pooled with the general debt).

How does SS redistribute in practice?

Measure redistribution by computing Social Security Wealth (SSW) of different generations. SSW is expected present discounted value of future SS benefits minus expected present discounted value of payroll taxes a person will pay. Formally,

$$SSW = -\sum_{t=0}^{t'\ast} \frac{c_t}{(1+r)^t} + \sum_{t=t'\ast+1}^{T} \frac{b_t}{(1+r)^t}.$$  

There is redistribution from those born later to those born earlier in our system. This is partly due to population growth and wage growth, and also tax rate growth. The payroll tax rate has increased from 2% in 1937 to 12.4% today. The more population growth and wage growth, the better the outcome for the current elderly.

Reasons for the provision of social security

Annuities market suffers from adverse selection, because the insured know more about their expected length of life than the insurer. This tends to lead to the price of annuities being too high for all but the longest expected lifetime individuals. But other individuals want to smooth their income over states of longer life versus shorter life as well. By forcing people to buy annuities, SS brings the amount of annuity bought closer to the efficient amount.

Also, if only private pensions were available, workers at small companies would be penalized by having to pay more for the pension, due to the higher risk of insuring a small group rather than a larger group.

Paternalism - the government assumes that people are myopic - not saving enough for their own retirement. It is true that most workers have little savings other than SS, private pensions and houses when they retire.
Does SS smooth consumption?

Many studies have been made on whether SS leads to more saving than without it or leads to less private savings.

Without SS, people would have to save (as individuals or through company pension plans) to finance retirement.

By allowing people to count on government transfer in old age, SS might lead to less savings. Research suggests that each dollar of SS wealth (present discounted value of the net benefit) crowds out 0.30 to 0.40 dollars of private savings.

What is the difference between having SS saving versus private saving? SS saving buys gov bonds, whereas private saving can be in both bonds and stocks. Can SS saving be productive?

The long-run effect of SS on average consumption depends on the population growth rate, on the depreciation rate of capital, and on productivity growth and how that depends on capital investment. A higher population growth rate leads to SS raising average consumption. A lower depreciation rate leads to SS raising average consumption. A more positive effect of capital investment on productivity growth tends to make SS reduce average consumption, due to social security reducing private saving.

Other evidence on SS’s effect - poverty rates of elderly

Poverty rate is percentage of a population whose income is below poverty level, which is amount of income needed to buy a “minimum acceptable” bundle of food, housing, other goods. Was $18850 for family of four in 2004. In 1960, 35% of elderly lived in poverty, compared to 21% of non-elderly.

In 2001 only 10% of elderly lived in poverty, compared to 12% of non-elderly.

This change corresponds to expansion of SS system. In the years when SS was growing the fastest- 1960s and 70s (total benefits paid increased), observe steepest reduction in poverty of elderly. Engelhardt and Gruber (2004) found that poverty fell for birth cohorts that benefited from expansion of SS relative to those who didn’t, concluded that expansion of SS can explain entire reduction of poverty among elderly over this period. Shows that individuals were not protecting themselves enough by saving.