Economic activity involves individuals making decisions within a larger social context, and the effects of these choices often spill over onto others. The production of steel, for example, may generate pollution, which harms the environment or the health of those living near the factory. Education provides benefits to society as a whole by increasing worker productivity. A market system sometimes doesn’t force individuals to account for those “external” benefits and costs when they make decisions, resulting in inefficient outcomes where there are too many activities with negative spillover effects and too few with positive effects.

Alfred Marshall first developed a theory of external economies (positive spillovers) and external diseconomies (negative spillovers) in his *Principles of Economics* (1890). He observed that the expansion of an industry may change production costs for all producers. For example, the invention of cost-saving machinery or the development of transportation networks, such as railroads, may not be worthwhile when an industry is small but yet repay themselves handsomely on a larger scale. But it was Marshall’s pupil, A. C. Pigou, who applied this theory more broadly in *Wealth and Welfare* (1912). These “externalities,” as they came to be called, represent failures of the “invisible hand” to generate outcomes that maximize societal wealth. For Pigou, the government should correct these shortcomings if it can do so effectively. The best strategy, he argued, would be to use taxes to reduce activities with negative externalities and to offer subsidies for activities with positive externalities. These measures came to be known as Pigovian taxes and subsidies.

Though later challenged by Ronald Coase, who argued that Pigou had underestimated the difficulties of computing the appropriate tax and subsidy rates, Pigou’s theory of externalities remains central to modern economic
analysis and policy. Today, governments utilize Pigovian taxes and subsidies to address a wide range of externalities, including carbon taxes to combat pollution and subsidies for higher education. In fact, William Nordhaus won the 2018 Nobel Prize in economics partly due to his estimates of the benefits associated with carbon taxes.

This painting of the Bethlehem Steel Works (1881) by American artist Joseph Pennell shows the plant emitting air pollution, an example of an external diseconomy.