

The Phillips Machine or MONIAC (Monetary National Income Analogue Computer)

[Video by the Reserve Bank of New Zealand](#)

This video by the Reserve Bank of New Zealand¹ shows very clearly the operation of the Phillips Machine, which is truly an extraordinary invention. Only someone like [“Bill” Phillips](#), with his diverse background, could have imagined and built it.

Prompt for Le Chat (Mistral): How effective was the Phillips machine in explaining economic variables and their interaction?

Answer: The **Phillips Machine**, also known as the **MONIAC** (Monetary National Income Analogue Computer), was an early hydraulic computer designed by economist **William Phillips** in 1949 to model the workings of a national economy. It used water flows, tanks, and pipes to represent economic variables like income, spending, investment, and government expenditure.

1. Effectiveness in Explaining Economic Variables

Strengths:

1. **Visual and Tangible Representation:** The machine made abstract economic concepts tangible. Users could see how changes in one variable (e.g., government spending) affected others (e.g., national income, inflation) in real time, making it a powerful teaching tool.
2. **Dynamic Feedback:** It demonstrated the interconnectedness of economic variables and the concept of feedback loops—how changes in one part of the economy ripple through the system.
3. **Hands-on Learning:** For students and policymakers, interacting with the machine provided an intuitive understanding of macroeconomic principles, such as the multiplier effect and the role of fiscal policy.
4. **Historical Context:** At the time, it was a groundbreaking tool for visualizing Keynesian economics, which dominated post-war economic thought.

Limitations:

1. **Simplification:** The machine was a highly simplified model of the economy. It could not capture the full complexity of real-world economies, such as behavioral economics, expectations, or international trade.
2. **Mechanical Constraints:** As a physical device, it was limited by its design. Adding new variables or changing the model required physical modifications, making it less flexible than mathematical or digital models.
3. **Obsolescence:** With the advent of digital computers in the 1960s and 1970s, the Phillips Machine became obsolete. Digital models could handle far more variables and complexity, and could be updated or modified much more easily.
4. **Theoretical Critiques:** Later economic theories (e.g., monetarism, rational expectations) challenged the Keynesian framework that the machine was based on, further reducing its relevance.

¹ New Zealand, which was a laboratory for many neoliberal policies in the 1980s, pioneered inflation targeting, and was the first country to adopt an inflation target for monetary policy, in 1990.

2. Legacy and Modern Analogues

While the Phillips Machine is no longer used, its spirit lives on in modern economic simulations and interactive models, such as:

- **Computer-based macroeconomic models** (e.g., DSGE models)
- **Educational software** (e.g., interactive simulations for teaching economics)
- **Policy analysis tools** used by central banks and governments

The machine remains a fascinating artifact in the history of economic education and modeling, illustrating how innovative tools can make complex ideas accessible.

Twelve key words from the above text, with definitions and synonyms (provided by Le Chat).

Here are 12 key economic terms from the text, each defined and paired with synonyms:

1. **Economy**; The system of production, distribution, and consumption of goods and services in a region or country; financial system, market, economic system
2. **Income**; The money received by individuals or a nation from work, investments, or business activities; revenue, earnings, wages
3. **Spending**; The act of using money to buy goods or services; expenditure, consumption, outlay
4. **Investment**; The allocation of money or resources with the expectation of generating future income or profit; capital expenditure, asset purchase, financial commitment
5. **Government expenditure**; Spending by the government on public goods, services, and infrastructure; public spending, fiscal outlay, state investment
6. **Inflation**; The rate at which the general level of prices for goods and services rises, reducing purchasing power; price increase, monetary devaluation, cost-of-living rise
7. **Feedback loops**; Processes where the output of a system is fed back into the system, influencing its future behavior; circular causality, recursive process, cause-and-effect cycle
8. **Multiplier effect**; The phenomenon where an initial change in spending leads to a larger change in national income; economic multiplier, ripple effect, income multiplier
9. **Fiscal policy**; Government actions regarding taxation and spending to influence the economy; budgetary policy, public finance policy, economic management
10. **Keynesian economics**; An economic theory advocating for government intervention to stabilize economic fluctuations through fiscal and monetary policies; demand-side economics, macroeconomic management, Keynesianism
11. **Behavioral economics**; The study of how psychological, social, and emotional factors influence economic decisions; psychological economics, decision science, cognitive economics
12. **Monetarism**; An economic theory emphasizing the role of money supply in determining economic activity and inflation; monetary policy, Friedman's theory, supply-side economics