Supporting Information to

The macroeconomic money-nature nexus: Are growing money supplies a relevant obstacle on the way to an ecologically sustainable global economy?

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S3 Appendix

Inflation rates that lag behind money growth

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Fig B │ Comparison of exponential and linear growth in absolute terms, shown by the development of a money stock of 100$ in 50 years with an annual money growth of 9%, 9$ or 4$ compared to an inflation of 4% per year.
On an evaluation scale of 0 to 100% for average annual rates like in S3 Fig 1, which were calculated as an average over a period of 30 years, the differences between monetary growth and inflation look small and tempt McCandless and Weber [1] to speak of a high positive correlation. However, this overlooks the difference between exponential growth and linear growth or between relative and absolute increases as illustrated in S3 Fig 2. As in Friedman and Schwartz [2] and Dewald [3] studies, the growth rates calculated by McCandless and Weber [1] are relative increases in percent and not absolute increases. The average growth rates therefore describe an exponential increase, where the total additional amount raises each year in absolute terms. With linear growth, on the other hand, the quantity added remains constant in absolute terms, which means that the percentage share of the total quantity and thus the growth rate is steadily decreasing as shown in S3 Fig 2.

Therefore, a “little” difference between growth rates means that the gap between the money stock and the price level broadens exponentially over the years (cf. development of Broad Money and CPI or the implicit GDP Deflator in Fig 1 in the main text and S1 Table 1). In the case of a difference of 5 percentage points per annum, the gap widens exponentially by a multiple of the years. This is in effect what is happening in reality, when the nominal money supply increases on average at a rate of 9%/a and the inflation (GDP deflator) with 4%/a. At the end of 20 years, the money supply will have increased by 560% compared to the base year, whereas prices will only have increased by 219%. In 50 years the money growth is 7435% whereas the price development is far behind with 710%. If this difference in growth rates continues, then the money supply will have risen by an unimaginable 552904% in only 100 years, while prices have risen a hundred times less at only 5050%. This means that although the empirical findings show a correlation, it is not a 1:1 correlation and therefore no empirical proof of the alleged [4,5] neutralization of money growth. It is the evidence to the contrary, because the correlated trends have been shifted on average by about 5 percentage points in favor of money growth. This 5 percentage points difference in annual growth rates is not insignificant, as they quickly create an exponentially widening gap between the money supply and price levels.
Fig A | Average annual rates of growth in M2 and in consumer prices 1960-1990 in 110 countries.

Source: McCandless and Weber [1], Chart 1 “Money Growth and Inflation: A High, Positive Correlation”, using data from the World Bank. Any views expressed herein are those of the authors and not necessarily those of the Federal Reserve Bank of Minneapolis or the Federal Reserve System.

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Fig B | Comparison of exponential and linear growth in absolute terms, shown by the development of a money stock of 100$ in 50 years with an annual money growth of 9%, 9$ or 4$ compared to an inflation of 4% per year.

Source: Own presentation.
References


