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Do product returns in the retail sector affect the price level? Evidence from the equation of exchange

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Abstract

Starting from Irving Fisher's equation of exchange ($MV = PT$) at the basis of the quantity theory of money and mainstream (macro)economics linking money (M) and its frequency of circulation (V) on the one hand to the general price level (P) and real goods and services exchanged (T) on the other, we analyze whether product returns by consumers (reaching 16.5% of total US sales in 2022) affect macroeconomic variables such as the price level and the velocity of money. We explore two different product-return scenarios: (1) reselling, and (2) destroying returned items. Based on a theoretical analysis and data for the US, we find that reselling product returns at a discount price reduces the price level, which is however not taken into account in the statistical measurement of the consumer price index. Moreover, the "modern" equation of exchange used in mainstream macroeconomics is an unsuitable instrument to study the effects of product returns on money velocity, because it neglects non-GDP-relevant transactions such as returning and reselling products. This leads to underestimate the actual velocity of money.

Keywords Deflation and inflation · Irving Fisher's equation of exchange · Product returns · Retail sector · Sustainable reverse logistics

1 Introduction

Product returns resulting from the rise in e-commerce in the retail sector are an increasing phenomenon all over the world. In Europe, population returning online purchases spanned from 53% (Germany) to 45–40% (France, Italy, Spain, UK) and

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32% (Poland) in 2018 (Savills Commercial Research, 2021). The global reverse logistics market is predicted to grow from $635.6 bn. in 2020 to $958.3 bn. in 2028 (Allied Market Research, 2021). In 2020 it already represented 1.3% of world GDP (The World Bank, 2023). US product returns in 2020 ($428 bn.) accounted for 10.6% skyrocketing to impressive 16.5% of total (online and store) sales in 2022 ($816.8 bn.) (Appriss Retail, 2022) while the ratio of product returns to nominal GDP in the US increased from 1.2% in 2007 to 3.2% in 2022 (Fig. 1).

Reverse logistics, namely managing returned items "from end user to recovery or to a new user" (De Brito & Dekker, 2004), cause significant costs for companies (Gustafsson et al., 2021) to be compensated either by reducing other production costs and/or profits or by increasing sales prices. While their impact on environmental sustainability (Cullinane & Cullinane, 2021) or customer satisfaction (Adebayo, 2022) has been previously explored, this never occurred for macroeconomic variables such as the general price level. The existing literature on product return policies is microeconomic in nature. Theoretical and empirical studies focus on consumer behaviour while there is little work on the retailer side (Abdulla et al., 2019) and none about its macroeconomic impact.

A significant theoretical work analyses money-back guarantees (MBG) and monetary leniency expressed as a refund amount or a restocking fee (Abdulla et al., 2019). In practice, retailers mostly offer full refunds for at least some period of time after purchase. Many goods returned have never been opened, remain as good as new, and can simply be put back on the shelf. Other returns, however, can only be

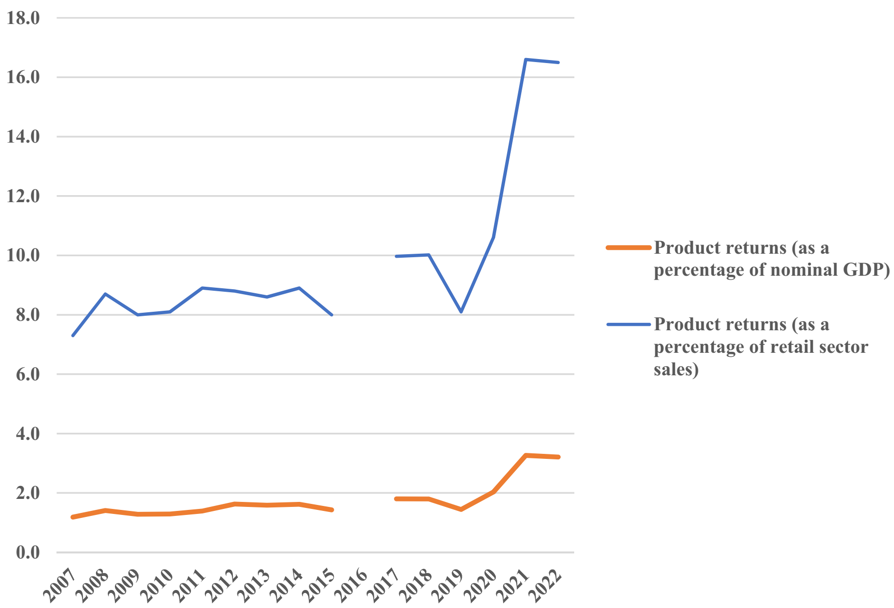

Fig. 1 Product returns in the US (2007–2022). Own elaboration based on Appriss Retail (2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022), Federal Reserve Bank of St. Louis (2023a, 2023b) and The Retail Equation (2010, 2011, 2012, 2013, 2014)

liquidated. In fact, there is a variety of merchandising options, including resales as new, warranty replacements, resales in secondary markets, resales as open-box items, salvages, disposals and sales to third parties (Abdulla et al., 2019).

Microeconomic models analyse the influence of return policies on firms' price and quantity decisions. Within a duopoly model of quality differentiated retailers, McWilliams (2012) shows that offering MBG results in higher prices for both high-quality and low-quality retailers. Using a model of a retailer selling both new and open-box products that are returned and restocked, Akçay et al. (2013) find that MBG without restocking returns increases the price of new products compared to when no returns are allowed. Moreover, empirical literature shows that higher levels of monetary and time leniency are significantly associated with higher prices (Posselt et al., 2008). The impact of returns on the quantity of products offered depends also on the kind of return policy. While reselling returns as new or open-box tends to reduce the required quantity of new products (Akçay et al., 2013; Ketzenberg & Zuidwijk, 2009), the scenario in which they can only be salvaged tends to increase it (Abdulla et al., 2019; Su, 2009).

Beyond this microeconomic stream of research, the present article represents the first attempt to trace the effect of product returns on fundamental macroeconomic variables like money in circulation (M), its frequency of changing hands (V), the general price level (P) and real output (Q), and paves the way for future, empirically more sophisticated contributions.

Based on Irving Fisher's equation of exchange, we explore two return policies of companies: items are afterwards resold (Scenario 1) or destroyed (Scenario 2). The first scenario is the most "natural", because companies have an obvious incentive to sell the consumer goods whose production they financed in advance. The second scenario may sound counterintuitive but is sometimes adopted by companies because of convenience. Recently, mass media extensively reported about destruction of unsold goods (BBC, 2022; CNN Business, 2021; Niranjan, 2020). About a quarter of all returns gets destroyed, where "destroyed in the best case means recycled, but often means ending up in a landfill or literally burned" (CNN Business, 2021).

The paper is structured as follows. Section 2 presents the materials and methods used, Sect. 3 the results for the modified equation of exchange and Sect. 4 the results for the complete equation of exchange. Section 5 concludes.

2 Materials and methods

We focus on the US because of data availability and start from the equation of exchange of the quantity theory of money (Fisher, 1911, 1912):

$$MV = PT \tag{1}$$

where M is money in circulation to be measured by the monetary aggregate M1 which consists of "(1) currency outside the U.S. Treasury, Federal Reserve Banks, and the vaults of depository institutions; (2) demand deposits at commercial banks

[…] less cash items in the process of collection and Federal Reserve float; and (3) other liquid deposits" (Federal Reserve Bank of St. Louis, 2023c). We hereby neglect more comprehensive monetary aggregates like M2 because of including savings deposits, small-denomination time deposits or balances in retail money market funds not involved in transactions like (re)sales and/or reimbursements of sales. V is the velocity of money, namely the frequency at which one unit of currency is used to purchase any good or service in the economy within a specific period,[1] P the general price level and T the real goods and services that are bought or sold (often proxied by the total output of the economy). Moreover, PT is by definition equal to all nominal economic transactions within a specific period of time, which is empirically typically proxied by nominal GDP representing "the production of all final goods and services valued at current market prices" (Colander & Gamber, 2006). While the empirical relationship between money growth and inflation has weakened over time (Borio et al., 2023; Gertler & Hofmann, 2018), the equation of exchange is a relation that always holds (i.e., an identity).

Economists then often turned this identity into a theory by making different causal assumptions. Monetarists, for example, typically assumed that M directly affects P because V and T are considered to be stable or independent of the others. In this paper, we do not discuss these theories [see Senner and Surbek (2022) for an analysis of them]. Being instead interested in the economics of product returns, we start with Fisher's identity and slightly rewrite it. We separate all economic transactions into GDP-relevant transactions (e.g., paying wages) and transactions that do not affect GDP (e.g., purchasing an existing house). It should be recalled that already Keynes (1978) distinguished between an industrial and purely financial circuit and that Schumpeter (1954) separated productive from speculative finance. More recently, Bezemer (2014), Bofinger et al. (2021) and Werner (1997) showed the importance of separating finance that is more or less relevant for GDP. Against this backdrop, we separate all transactions T in the economy into GDP-relevant transactions and non-GDP-relevant transactions:

$$MV = PQ + P'Q' \tag{2}$$

where PQ is nominal GDP, and $P'Q'$ reflects the nominal value of all the transactions that are not part of GDP. This includes the purchase and sale of existing real estates, financial instruments, other pre-existing goods and also certain transactions related to the returns of consumer goods. While in the first half of the twentieth century it was common for economists to look at all economic transactions, in the last decades they typically only focused on GDP relevant transactions (Senner & Surbek, 2022). To create a link to this apparently new consensus in economics, we also define an alternative, "modern velocity" $\widetilde{V}$ which ignores non-GDP relevant transactions:

[1] Often, only the velocity of money for domestically produced goods and services is analyzed ["the frequency at which one unit of currency is used to purchase domestically produced goods and services within a given time period" (Federal Reserve Bank of St. Louis, 2023e)].

Table 1 The modified equation of exchange for the US (2007–2022)

	M	$\widetilde{V}$	$M\widetilde{V}$	P	Q	PQ	Correspondence between $M\widetilde{V}$ and PQ (%)
2022	20,405.0	1.28	25,485.8	1.27	20,015.4	25,462.6	100
2021	19,355.9	1.20	23,299.7	1.19	19,609.8	23,309.3	99.9
2020	12,842.3	2.33	29,964.2	1.14	18,509.1	21,057.6	70.4
2019	3,845.3	5.56	21,383.9	1.12	19,036.1	21,380.3	100
2018	3,684.0	5.58	20,552.1	1.10	18,609.1	20,532.3	100
2017	3,521.5	5.53	19,465.1	1.08	18,076.7	19,476.3	100
2016	3,245.9	5.76	18,686.6	1.06	17,680.3	18,694.5	100
2015	3,020.2	6.03	18,197.4	1.05	17,390.3	18,205.8	100
2014	2,814.0	6.24	17,547.2	1.04	16,932.1	17,549.8	100
2013	2,549.4	6.61	16,847.3	1.02	16,553.3	16,842.6	100
2012	2,316.8	7.03	16,283.6	1.00	16,254.0	16,253.7	99.9
2011	2,006.4	7.78	15,610.1	0.98	15,891.5	15,599.3	99.7
2010	1,740.9	8.64	15,039.0	0.96	15,649.0	15,048.3	100
2009	1,637.7	8.84	14,481.7	0.95	15,236.3	14,477.9	99.9
2008	1,433.8	10.31	14,785.6	0.94	15,643	14,770.5	99.8
2007	1,374.5	10.54	14,489.0	0.93	15,623.9	14,473.6	100

Authors' own elaboration based on Federal Reserve Bank of St. Louis (2023b, 2023c, 2023d, 2023e)

$$M\widetilde{V} = PQ \tag{3}$$

Note that $\widetilde{V}$ is always equal or smaller than the holistic velocity V. If more and more money in the economy is used for non-GDP relevant transactions, $\widetilde{V}$ drops, while V could remain constant or even grow. Because of limited data availability to measure non-GDP transactions, the existing literature almost exclusively discusses $\widetilde{V}$. Note that while it makes sense to think about V as a velocity (i.e., the turnover) of the money stock, $\widetilde{V}$ should rather be interpreted as the ratio between nominal GDP and the money stock.

Regarding US statistics, the Federal Reserve Bank of St. Louis calculates $\widetilde{V}$ in this indirect way, namely by dividing nominal GDP by M. Table 1 shows the corresponding data for the period 2007–2022. The left-hand side of the modified equation of exchange $M\widetilde{V}$ almost perfectly corresponds to the right-hand side PQ. Statistical data in Table 1 are on an annual basis and seasonally adjusted with M corresponding to M1, $\widetilde{V}$ to its velocity $\left(\frac{PQ}{M1}\right)$, P to GDP implicit price deflator (index 2012 = 100) divided by 100 and Q to real GDP. For sake of completeness, the less strong statistical correspondence in 2020 might be due to a significant shift of items from the monetary aggregate M2 to M1 occurred in May 2020 (Federal Reserve Bank of St. Louis, 2021).

Our first research question is: does returning (i.e., reimbursing) and either reselling or destroying almost one-trillion-US-dollars-worth products yearly alter the equation of exchange and—if so—which of its variables? Our second research question is: does such increasingly recurrent behavior alter the purchasing power of money by affecting the general price level?

3 Results for the modified equation of exchange

First, we present the effect of the two scenarios on the modified equation of exchange. Both scenarios assume that the goods have already been paid and a refund becomes necessary implying an increase in the number of monetary transactions.

3.1 Scenario 1: product returns are resold

In this scenario, the product items are first returned and then resold. The return temporarily increases the stock of the firm. Q remains constant since GDP encompasses additions to private inventories (Amadeo, 2022). Also M remains unaffected (i.e., constant).

Assuming an MBG as mentioned above or monetary leniency with full refund, the monetary transaction from the buyer to the seller is simply reversed. If the *same* returned product is sold again for the *same* money amount corresponding to its sale price, $\widetilde{V}$ remains constant (i.e., the GDP-relevant transactions have not changed). Given that M, Q and $\widetilde{V}$ remain constant, so does the price level P.

However, returned items often depreciate (Ebelthite, 2023) and cannot be resold at their original sale price. We will, therefore, more generally assume that the price of the resold item can be lower than the original price. The effective price level P_e would then be the weighted average of the prices of the new and refurbished products:

$$P_e = \frac{P(Q - R) + \delta PR}{Q} \tag{4}$$

where R denotes product returns and δPR corresponds to the resale value of returned items with $0 < \delta \leq 1$ and $(1 - \delta)$ being the discount rate. Increasing the share of refurbished products in the economy would then reduce the effective price level and increase the purchasing power of money. However, this is not taken into account in the statistical measurement of the consumer price index based on a given basket of "new" goods and services. This leads to an overestimation of the actual price level like already known upward biases from omitted consumer substitution, insufficient quality adjustment and insufficient addition of new goods (Reed & Rippy 2012). The omission of product returns increases the substitution bias: a discount for refurbished products will cause consumers to reduce their purchases of new goods and to purchase instead a refurbished substitute with a relatively lower price. The fact that returned products are resold cheaper is also confirmed by recurring promotions

Table 2 The effect of the resale of product returns

	$\widetilde{V}$	$\widetilde{V}_e$	P	P_e	Empirical findings
δ= 0.5	1.25	1.22	1.27	1.25	Deflationary in terms of P, recessionary in terms of PQ and slowing down $\widetilde{V}$
% change	– 2.2		– 0.2		
δ= 1	1.25	1.25	1.27	1.27	Price-neutral, no effect on PQ and hence on $\widetilde{V}$
% change	–		–		

Authors' own elaboration based on Appriss Retail (2022) and Federal Reserve Bank of St. Louis (2023b, 2023c, 2023d, 2023e)

applied by online shops like Amazon, which offer up to 50% discount on warehouse items (Denkena et al., 2023).

Regarding the modified equation of exchange, the effective velocity of money $\left(\widetilde{V}_e = \frac{P_e Q}{M}\right)$ would be lower than the measured one:

$$\overline{M}\widetilde{V}_e \downarrow = P_e \downarrow \overline{Q} \tag{5}$$

The magnitude of the bias depends on the share of returned products and the discount rate $1 - \delta$. Let us consider a hypothetical example with data for 2022 taken from Table 1 and Fig. 1: M = \$20,405.0bn., Q = \$20,015.4bn., P = 1.27 and R = \$816.8bn. Let us assume that the resale value of returned items is half of their original value ($\delta = 0.5$). Calculating the effective velocity of money $\widetilde{V}_e$ and price level P_e yields 1.22 and 1.25, respectively. Given current levels of product returns and assuming a price reduction on resales by 50%, we see that the modern velocity would decline by 2.2% and the price level by 0.2% (see Table 2).

Whenever $\delta = 1$ product returns would, in turn, have no effect on P and $\widetilde{V}$.

3.2 Scenario 2: product returns are destroyed

Whenever the original seller destroys returned items, M remains constant as in Scenario 1. However, destroying product returns deprives their previous, underlying money issue (i.e., when they were initially produced as goods and services) of its real "collateral" (Q). Compared to our baseline scenario, where all items are sold without any returns, the destruction in this scenario causes real GDP (Q) to decline by the amount of product returns. Summing up: while M does not change, $\widetilde{V}$ and Q shrink but they do not cause any change in terms of P:

$$\overline{M}\widetilde{V} \downarrow = \overline{P}Q \downarrow \tag{6}$$

This can be disaggregated as follows:

$$M\left[\frac{[P(Q-R)]}{M}\right] = P(Q-R) \tag{7}$$

P does not change, because $\widetilde{V}$ declines proportionally to output. We also replicate the empirical analysis with the 2022-data as we did for Scenario 1 and assume that

Table 3 The effect of destroying 25% of all product returns

	$\widetilde{V}$	$\widetilde{V}_e$	Q	Q_e	Empirical findings
$\delta = 0$	1.25	1.20	20,015.4	19,811.2	Recessionary in terms of PQ and slowing down $\widetilde{V}$
% change	– 4.2		– 1.0		

Authors' own elaboration based on Appriss Retail (2022) and Federal Reserve Bank of St. Louis (2023b, 2023c, 2023d, 2023e)

about a quarter (25%) of all product returns is destroyed (CNN Business, 2021), which corresponds to \$204.2bn. out of \$816.8bn.

After due calculation, the effective velocity of money $\widetilde{V}_e$ corresponds to 1.20 as in Scenario 1 while real output after the destruction Q_e is equal to \$19,811.2 bn. The destruction causes the modern velocity to decline by 4.2% and real output by 1% (Table 3).

4 Results for the complete equation of exchange

While the previous section analyses the effect of two product return scenarios on the modified equation of exchange (with non-GDP transactions being not relevant), Sect. 4 takes a more holistic approach and looks at the effect of the scenarios on the complete equation of exchange with non-GDP transactions (Eq. (2)).

4.1 Scenario 1: product returns are resold

Whenever the original seller (i.e., a company producing goods and services) resells items returned by their customers, M and Q remain unaffected, but the non-GDP transactions Q' increase because of returning and reselling products R. Therefore, also the effective money velocity V_e changes:

$$MV_e = PQ + P'(Q' + R) \tag{8}$$

As mentioned above (Sect. 3.1), returned items are often resold at a discount price (i.e., at the original price times delta where $0 < \delta < 1$). Under such circumstances, Q does not change if all returned goods are resold again, P_e(i.e., the effective price level related to GDP) declines, while non-GDP transactions Q' increase with products resold at lower prices P'. M remains constant by assumption:

$$\overline{M}V_e \uparrow = P_e \downarrow \overline{Q} + P' \downarrow Q' \uparrow \tag{9}$$

The price levels related to GDP (P_e) and non-GDP transactions (P') can be written in more detail as:

- $P_e = \frac{P(Q-R)+\delta PR}{Q}$ since the price of refurbished items declines, while all other items are sold at the original price level;

- $P'_e = \frac{P'[Q'+R]+\delta P'R}{Q'+2R}$ since returned items are potentially sold for less than their original price.

With specific regard to the complete equation of exchange, we obtain:

$$MV_e = [P(Q-R) + \delta PR] + [P'Q' + P'R + \delta P'R] \tag{10}$$

Rearranging, we get a term for the effective velocity, taking into account product returns and resales:

$$V_e = \widetilde{V}_e + \frac{(\delta - 1)PR + (\delta + 1)P'R}{M} \tag{11}$$

For the special case $\delta = 1$ we get:

$$V_e = \widetilde{V}_e + \frac{2P'R}{M} \tag{12}$$

which is intuitive, since we have two additional transactions compared to the baseline (i.e., the return and the resale) and the velocity increases depending on the nominal value $2P'R$ of these additional transactions. The more items are returned in the economy, the more the velocity increases.

For δ smaller than 1, the first term of the fraction in Eq. (11) becomes negative reducing the velocity, but the second term will increase the effective velocity so that there are two opposing effects. Intuitively, if the price of the resold goods decreases significantly (small δ), the overall velocity representing the turnover of money will also decrease despite a higher number of transactions due to the return and the resale. If δ is smaller than the following threshold δ^*, then the velocity will decrease:

$$\delta^* = \frac{P - P'}{P + P'} \tag{13}$$

The analysis of scenario 1 (Sects. 3.1 and 4.1) neglects that firms face costs associated with the returned items and their reselling. If they correctly anticipate the amount of returns, they may be able to adjust the overall price level accordingly. If they charge these costs on top of the price of the refurbished products, the discount factor $1 - \delta$ would be lower and the overall velocity of money may increase relative to the baseline scenario consisting of no product returns. But the costs associated with product returns also contribute to GDP (e.g., income of logistics/packaging companies and truck drivers etc.), so that a more detailed analysis would be needed.

Finally, we compare Eq. (9) representing the holistic velocity V to the modern velocity $\widetilde{V}$ (defined as nominal GDP divided by M). More precisely, we use the insights from above to replace P_e, Q_e and M_e:

$$\begin{aligned} \tilde{V}_e &= \frac{P_e Q_e}{M_e} \\ &= \frac{P((Q-R) + \delta R)}{M}. \end{aligned}$$

Thus, if we restrict our analysis to the modified Fisher equation which ignores non-GDP transactions, we reach the same result as in Sect. 3.1 which confirms the rightness of our demonstration.

4.2 Scenario 2: product returns are destroyed

As above (Sect. 3.2), Q declines by the amount of the destroyed product returns R compared to the baseline where all items are sold. M and P' remain constant by assumption since consumers get a total refund. The number of non-GDP relevant transactions increases by $2R$, where R is the returned item which was first sold and then bought back. For the complete equation of exchange, we obtain:

$$MV_e = P(Q - R) + P'\left(Q' + 2R\right) \tag{14}$$

Solving for the velocity, and simplifying, we get:

$$V_e = \frac{PQ + P'Q'}{M} + \frac{2P'R - PR}{M} = V + \frac{2P'R - PR}{M} \tag{15}$$

We see that the holistic velocity based on the complete equation of exchange increases by the returned and destroyed products, which is intuitive since more transactions occur (although all of them are not relevant for GDP). Next, we relate Eq. (15) representing the holistic velocity V, to the modern velocity $\widetilde{V}$ (defined as nominal GDP divided by M):

$$\begin{aligned}\tilde{V}_e &= \frac{P_e Q_e}{M_e} \\ &= \frac{P(Q - R)}{M} \\ &= \tilde{V} - \frac{PR}{M}\end{aligned}$$

which is equivalent to the result in Sect. 3.2. The intuition is again that nominal GDP declines because of the decrease in real output. Price level P and M are not affected while the modern velocity $\widetilde{V}$ declines. Note that the holistic Fisher velocity increases in the same scenario.

Our analysis of scenario 2 (Sects. 3.2 and 4.2) neglects that firms face costs associated with the destruction of product returns as well as opportunity costs by foregone profits. If firms pass on these costs to consumers by raising prices, the overall price level would increase rather than remaining constant.

5 Conclusions

The present paper analyzes for the first time in the economic literature whether product returns by consumers affect macroeconomic variables and, in particular, the price level and the velocity of money. We find that the answer depends on whether the returned items are resold or destroyed. If they are resold at a discount price (which usually occurs), the price level given by the weighted average of the prices of the original and refurbished products declines. However, product returns are not taken into account in the statistical measurement of the consumer price index which results in an upward measurement bias. Knowledge of the corresponding underestimation of consumers' purchasing power may be relevant for central banks' inflation targets. We also find that the magnitude of the bias increases with the share of returned products in total sales and the price discount of refurbished products. If product returns are destroyed, real GDP declines while the price level remains constant.

Moreover, we find that the "modern" equation of exchange used in mainstream macroeconomics is an unsuitable instrument to study the effects of product returns on the velocity of money because it neglects non-GDP-relevant transactions such as returning and reselling products. Based on this equation ($M\widetilde{V} = PQ$), reselling returned products at a discount price or destroying them would decrease money velocity $\left(\widetilde{V} = \frac{PQ}{M}\right)$ by affecting P or Q.

However, using the original equation of exchange ($MV = PT$), which incorporates also non-GDP-relevant transactions, we find that the general velocity of money V increases as long as the resale value of returned items does not decline too much or the returned products are destroyed. This is due to the fact that selling and returning product items results in more non-GDP transactions. Since the statistical measurement of money velocity (Federal Reserve Bank of St. Louis 2023e) is based on the "modern" equation of exchange, it appears to be biased towards underestimating the actual, holistic velocity V. This bias increases with a growing share of returned products in GDP.

Moreover, the way we estimated the equation of exchange abstracts from transportation costs, payment fees and other costs associated with the return of product items. Our macroeconomic results are, therefore, inconsistent with microeconomic literature showing that costly product returns cause firms to raise prices (see Sect. 1). The German E-Commerce and Distance Selling Association also confirms that "dealers pass these costs to customers" (Kläsgen, 2022) while processing costs of product returns are on average 59% of the item's original selling price (Johnson, 2022). This could be incorporated into our model by assuming that the price discount $1 - \delta$ for returned products is reduced accordingly—or even increased with a negative δ. The total cost of returned products should increase with the number of non-GDP-relevant transactions. To analyze this in more detail is a task for future research.

Currently, no official data are collected to map what share of product returns is *actually* resold or destroyed. Especially for scenario 2, information is fragmented and mostly represented by estimations. For instance, a US retail industry blog reported that "[e]asily 25% of all these returns get destroyed" (CNN Business, 2021), while in Germany alone, "[a]n estimated €7 billion worth of goods are destroyed each year" (Niranjan, 2020), which corresponded to "just" 0.2% of GDP (Statista, 2022) and 3.0% of M1 (Trading Economics, 2022) in 2019. However, these data refer to the time before the COVID-19 pandemic. Clearly enough, the pandemic significantly contributed to the acceleration of product returns because of having pushed online purchases due to lockdowns (Guthrie et al., 2021). However, it is imaginable that the great bulk of returned items – especially, in the future – will be linked to the increasing use of digital means of payments, which by definition facilitate instantaneous purchases and enable equally rapid reimbursements (Crede, 1995). Product returns and their economic effects on companies, consumers and the economy in general are, therefore, bound to become a relevant field of study.

Further studies could have a closer look into the payment methods. While this article assumed deposit payments (within the monetary aggregate M1), credit card payments, consumer debt and other payment methods are rising and might affect the amount of M. As the Federal Reserve Bank of New York (2023) recently reported, credit card balances jumped to $986bn. At the same time, future research might differentiate more in detail between a refund in the original payment form, but also the exchange of the returned item for another one (i.e., of the same or a different type) or even a store credit.

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Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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