# The Problem of the Origin of Monetary Profit

by James Smith

I feel that there is a gross misconception among the public about some basics concepts of economics.

Basically this is what we are going to do in this work:

· Discuss the problem of the monetary profit, and how it creates the demand for new money.

· Add to the current perception of money circulation between firms and households.

· Define Government's role as the supplier of new money, and what challenges it has to face.

· Refute the notion that banks create new money, and reevaluate their role in the economy and the effect of loan bubbles.

· Prove that calculated government budget deficit is vital for economy.

· Discuss about possible methods to inject new money in an effective way.

So let's do this.

# Glossary

Monetary Profit- I define "monetary profit" as a portion of earned money that is not supposed to be used for spending. The moment it is used for spending, it is no longer considered as profit and is converted into "expenditure".

Injection- I know that in economics they already use the term "injection". Here we use it differently. Here when I say "injection" I mean a process when the government introduces new money into circulation. This money has to be new money, and not money that was taken out previously from circulation and now is being returned, like taxes for example.

Usually I will say "injection of new money", that may look redundant, because "new money" is part of definition of "injection" (kind of like saying "eat food"), but it's ok.

Public- all the employees.

Participants- employees and firms. An individual can be both an employee and a firm owner, like a manager that receives a salary who also owns the firm.

Cycle- theoretical time period, when the company spends money on labor, produces a certain amount of goods, and sells all of that amount. In the end of the cycle the firm is supposed to return to staring position, hopefully with added profit to its balance.

Excessive products- this means that there is a demand for those products, but they can only be purchased by injected new money (I will explain shortly).

Redundant products- products that the public have no demand for them.

* (Maybe "excessive" is not the best word for it, since it means similar as "redundant". Maybe we should think on another word instead of "excessive" … but let's keep it for now, maybe I replace it in the future with a more suitable word.) *

Irrational behavior- behavior that maybe rational from individual point of few, like firms' tendency to raise prices, or people's tendency to spend money when they have it, and not plan for the future. But from long term perspective, this may be bad for circulation.

Purchase pattern- personal preferences of the public to make purchases in a certain way.

**Content**

# Introduction

Let's say we have a scenario of a single person living on an isolated island, let's say his name is John. This person decides to open a firm that will plant coconut trees and collect the harvest. John is the owner of the firm, but he also registers himself as the only employee. He decides to pay himself a monthly salary of 120 dollars.

Now each month John manages to grow and collect 120 coconuts.

Now John's firm has a monthly expenditure of 120 dollars.

So the firm must set the price at least 1 dollar per coconut in order to break even. With this price John will be able to purchase 120 coconuts. Now let's say the firm decides to make a profit, and decides to sell coconuts for 2 dollars. Now John can only purchase 60 coconuts… So each month the firm pays John 120 dollars, produces 120 coconuts, sells 60 coconuts to John for same 120 dollars and it still has the remaining 60 coconuts.

So each cycle the firm makes profit in form of 60 coconuts, but it doesn't make any monetary profit. In fact, no matter what price the firm sets, it can never make a profit in form of money, only in form of excessive coconuts that John wasn't able to purchase.

And if John to make a monetary profit from his salary, by not spending all of it on coconuts, that will cause the firm to lose money each cycle. The firm won't be able to earn back what it spent on labor, and each cycle it will have to reduce John's salary.

Why? Because John's only source of monetary income is the firm, and firm's only source of monetary income is John. Therefore, the firm can never earn more money that it spends. No regular monetary profit is sustainable in an economy with a fixed amount of money. You have to have a constant external source of money, that will be periodically introduced into circulation.

That's it. Here we proved that the "Money Circulation" that they teach in textbooks can't be right. The image where money goes from firms to households, and from households back to firms, can't be the full picture. Because we all know that firms and households make profit, but that's not sustainable without a periodical external injection of new money. And in our reality the source of injection is the government of course.

It doesn't matter how much employees and firms you add, it's a zero sum equation.

Let's say we add another person to the island, Jack. Now John doesn't work anymore, and only collects the profit. Once again no matter how much John pays Jack, he can only profit in form of coconuts, but never in form of money. John will never earn more money than he paid to Jack.

Let's use another example.

Let's say we have a closed economy of 6 firms that produce different products. Each firm employs 10 people, 9 workers and a manager. Managers are also firms' owners. Each manager decides to pay himself 120 dollars each month, and each worker will receive 90 dollars each month. So each firm will have a monthly labor expenditure worth of 930 dollars.

The cycle of all the firms is a period of one month, and it's synchronized (meaning they all start and finish their cycle at same time).

Let's say that labor is the only expenditure that each firm has. Also each firm decides to make 7% of profit from sales. So the total monthly price of products that each firm produces, will be worth 1000 dollars.

Let's also say that the public will always try to purchase all the available goods that are available each cycle.

Also let's say that firms begin with a capital of 930 dollars.

Table A.

| Firm A | Firm B | Firm C | Firm D | Firm E | Firm F | a.p.p.a | f.a.p.p | injection |
|---|---|---|---|---|---|---|---|---|
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |

a.p.p.a. — aggregate public purchase ability

f.a.p.p. — firm's aggregate products prices (GDP)

So in this table each row represents a cycle. In a single cell we can see each firm total expenditure, that is eventually equal to public's aggregate purchasing ability of 5580 dollars. Also we see that the aggregate firms' products prices is equal to 6000.

As we see, by adding more firms and employees we don't solve the origin of the profit problem. Each cycle the firms are left with total amount of 420 dollars' worth of goods that the public was unable to purchase.

As we see in a closed cycle economy with fixed amount of money, no profit is possible for the firms or public.

The firms may make profit in form of excessive goods, meaning that they will be able to make a revenue that is exactly equal to their expenditure each cycle, and still have some products left in the storage. But they will never be able to make any monetary profit from this excessive goods, nobody has money to buy it.

The only way to firms to make a monetary profit, is only if some other firms will start to lose money each cycle. If let's say Firm F will be able to sell only 800 dollars' worth of goods, meaning that the public would spend 130 dollars on other firms' products.

But that can't last for long. Firm F will lose money each cycle, so it will have to reduce its labor expenditures and the amount of products being produced. Basically in 10 cycles Firm F will disappear and we will go back to the state were no profit is possible, with the same amount of money going back and forth between the firms and the public.

So each cycle we have to have an external source of new money that will be injected into circulation each cycle, so that a profit may be possible. So we need the government to print new 420 dollars and use it to purchase the excessive goods.

It can do it by direct purchase, or by employing state servants (like a fireman, policeman, teacher) and paying their salaries with new money, that these servants will eventually use for purchasing the excessive goods.

So we have next equations, for each cycle:

f.a.e. = a.p.p.a

f.a.p.p — f.a.e. = P

P > a.p.p.a.

P = I

f.a.e. = firms' aggregate expenditure

a.p.p.a. = aggregate public purchase ability

f.a.p.p.= firms' aggregate product prices

P = profit

I = injection

Now you may claim that in the real world firms have additional expenditures than just labor, but how will it change the main picture? Public aggregate purchasing ability will be always equal to firms' aggregate expenditure, and in order for profit be possible the firms' aggregate products prices will have to always be above aggregate expenditure.

For example you add government taxes. So now the equation is like this:

(g.p.a = government purchase ability)

f.a.e. = labour expenditures +taxes= a.p.p.a +g.p.a.

f.a.p.p. — f.a.e. = P

P > a.p.p.a. +g.p.a.

P = I

Once you increased firms' expenditure by adding taxes, you forced the firms to raise their prices in order to make profit. You added the government and its taxes revenue to the aggregate purchasing ability, but equally you increased the firms' aggregate prices. So you are back where you started.

So government collecting taxes and using it for spending is in no way can replace the need of injection of new money.

Now if you add the ability of public to make profits, meaning that people won't spend their whole salary each cycle, then you decrease the aggregate public purchasing ability, and you will have to increase the injection amount in order to compensate it, so that firms will be able to sell all the goods and finish the cycle.

How about adding raw materials to the expenditures list? Ok let's go to the next chapter.

## Intermediate expenditures and profit

Let's say we have a closed economy of three firms, a tomato farm, a canning factory and a store.

The tomato farm has 10 employees, and it sells its product to the canning factory for 4% profit.

The canning factory has 5 employees, and it sells its product to the store for 7% profit.

The store has 3 employees and it sells its product to the public for 10% profit.

All the firms' employees consist of workers and one manager. Workers' monthly salary is 90 dollars each, and manager salary is 120 dollars.

So the tomato farm spends 930 dollars on labor, the factory spends 480 dollars, and the store spends 300 dollars.

The cycle of all the firms is one month and it's synchronized.

The public also will try to purchase all the available goods each cycle.

Table B.

| tom farm | can fac | store | a.p.p.a. | inject |
|---|---|---|---|---|
| 968,75 | 1557,796 | 2064,217 | 1710 | 354,2174 |

tom farm = tomatoes farm

can fac = canning factory

Simulation

/

The farm grows tomatoes, and spends 930 dollars on labor. Now it sells the final product to the canning factory for 968,74 dollars in order to make 4% profit.

The canning factory processes the tomatoes and spends 480 on labor. Now its total expenditure is 1448,75 dollars, and it sells it to the store for 1557,79 dollars in order to make 7% profit.

The store spends 300 dollars on labor, and it sells the product back to the public for 2064,22 dollars in order to make 10% profit.

/

So the aggregate prices are 2064,22 dollars, while public purchasing ability is only 1710 dollars. So we need an injection of 354,21 dollars.

So even though technically the average firms' profit is 7% (4%, 7%,10%), but really in total it's 17,16% due to intermediate stages.

But even though, the rule of I=P still applies.

We sum up all the profits:

Farm= 38,75 dollars (4%).

Factory = 109,0457 dollars (7%).

Store = 206,422 dollars (10%).

Total= 354,218 dollars.

Now even though that firms' aggregate expenditure is no longer equal to public aggregate purchasing ability, due to some of firms' expenditure being used to cover other firms' profits, we still maintain I = P.

So the government can use two methods:

-Simply to sum up all the firms' profits and inject equal amount of new money.

-Find the difference between the store aggregate prices and aggregate public purchasing ability, and cover it with injected new money.

Either way the rule of P = I is maintained.

Now how about the banking system? How would the ability of loaning the profit money to the public will affect the situation?

# Debt or "suspended profit"

Table C

| pub inc | loan rep | pub dep | a.p.p.a | f.a.p.p. | injectior | firm profit | loaned | loan tot | real mon | virtual fir | virtual pub | vir tot |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9300 | 0 | 651 | 8649 | 10000 | 700 | 700 | 651 | 651 | 700 | | | |
| 9300 | 65,1 | 646,443 | 8588,457 | 10000 | 0 | 700 | 1411,543 | 2062,543 | 700 | | | |
| 9300 | 206,2543 | 636,5622 | 8457,184 | 10000 | 0 | 700 | 1542,816 | 3605,359 | 700 | | | |
| 9300 | 360,5359 | 625,7625 | 8313,702 | 10000 | 0 | 700 | 1686,298 | 5291,658 | 700 | 2800 | 2559,768 | 5359,768 |
| 9300 | 529,1658 | 613,9584 | 8156,876 | 10000 | 0 | 700 | 1843,124 | 7134,782 | 700 | | | |
| 9300 | 713,4782 | 601,0565 | 7985,465 | 10000 | 0 | 700 | 2014,535 | 9149,317 | 700 | | | |
| 9300 | 914,9317 | 586,9548 | 7798,114 | 10000 | 0 | 700 | 2201,886 | 11351,2 | 700 | | | |
| 9300 | 1135,12 | 571,5416 | 7593,338 | 10000 | 0 | 700 | 2406,662 | 13757,87 | 700 | 5600 | 4933,279 | 10533,28 |
| 9300 | 1375,787 | 554,6949 | 7369,519 | 10000 | 0 | 700 | 2630,481 | 16388,35 | 700 | | | |
| 9300 | 1638,835 | 536,2816 | 7124,884 | 10000 | 0 | 700 | 2875,116 | 19263,46 | 700 | | | |
| 9300 | 1926,346 | 516,1558 | 6857,498 | 10000 | 0 | 700 | 3142,502 | 21754,96 | 700 | | | |
| 9300 | 2175,496 | 498,7152 | 6625,788 | 10000 | 0 | 700 | 3374,212 | 23717,63 | 700 | | | |
| 9300 | 2371,763 | 484,9766 | 6443,26 | 10000 | 0 | 700 | 3556,74 | 25731,56 | 700 | | | |
| 9300 | 2573,156 | 470,8791 | 6255,965 | 10000 | 0 | 700 | 3744,035 | 27789,29 | 700 | | | |
| 9300 | 2778,929 | 456,4749 | 6064,596 | 10000 | 0 | 700 | 3935,404 | 29881,57 | 700 | | | |
| 9300 | 2988,157 | 441,829 | 5870,014 | 10000 | 0 | 700 | 4129,986 | 31997,03 | 700 | 11200 | 8893,286 | 20093,29 |
| 9300 | 3199,703 | 427,0208 | 5673,277 | 10000 | 0 | 700 | 4326,723 | 34121,86 | 700 | | | |
| 9300 | 3412,186 | 412,147 | 5475,667 | 10000 | 0 | 700 | 4524,333 | 36239,53 | 700 | | | |
| 9300 | 3623,953 | 397,3233 | 5278,723 | 10000 | 0 | 700 | 4721,277 | 38330,33 | 700 | | | |
| 9300 | 3833,033 | 382,6877 | 5084,279 | 10000 | 0 | 700 | 4915,721 | 40370,93 | 700 | | | |
| 9300 | 4037,093 | 368,4035 | 4894,503 | 10000 | 0 | 700 | 5105,497 | 42333,93 | 700 | | | |
| 9300 | 4233,393 | 354,6625 | 4711,945 | 10000 | 0 | 700 | 5288,055 | 44247,77 | 700 | | | |
| 9300 | 4424,777 | 341,2656 | 4533,957 | 10000 | 0 | 700 | 5466,043 | 46157,07 | 700 | 16100 | 11576,8 | 27676,8 |
| 9300 | 4615,707 | 327,9005 | 4356,392 | 10000 | 0 | 700 | 5643,608 | 48056,65 | 700 | | | |
| 9300 | 4805,665 | 314,6035 | 4179,732 | 10000 | 0 | 700 | 5820,268 | 49941,51 | 700 | 17500 | 12219,3 | 29719,3 |

Pub inc = public income

Loan rep= loan repayments

Pub dep = public deposits

loan tot = aggregate amount of loaned money

real mon= money that are physically deposited

Virtual fir, pub, tot = virtual "firm", "public taxes" and "total" money that appears as deposited

Now let's say we have a closed economy with 10 firms, that have 10 employees each, let's say to make it easier every employee makes same salary of 93 dollars, including the managers (who are also the owners).

Now let's say that the government decides to tax 7% of people's salary and deposit it in a bank. Also the government allows to public to borrow this money without any interest rates, on the condition of having to make monthly payments of 10% of the loaned sum.

The firms also are ready to work for 7% profit in each cycle, and it will be deposited in the government bank. All firms' cycle is equal to one month and synchronized.

The public will try to purchase every product available with money it holds, and by taking loans. If an employee has to make a loan payment, it will be reduced automatically by the government from his salary, and the employee will pay 7% tax of the remaining money in that month, and not from the original amount (for example if he made a monthly loan payment of 10 dollars, he will now pay 7% tax from the remaining 83 dollars of the salary, and not from original 93 dollars).

Also in this simulation all the loans will be made collectively. So if the public loaned 1000 dollars, that means every person have loaned 1 dollar individually, and has to make a monthly payment of 10 cents.

Simulation

/

Cycle 1

The public receives a salary of 9300 dollars, and immediately pays 651 dollars of taxes. Now the public is left with 8649 dollars, so people purchase goods with this money.

So the firms are left with 1351 dollars' worth of goods, and the public wants to borrow money to buy it. Now in the bank there is 651 dollars available to loan, so the government decide to directly purchase additional 700 dollars' worth of goods.

So the public borrows 651 dollars and buys all the remaining goods.

So in the end of the cycle we are left with 700 dollars of real money being present in the bank account. This the amount that was injected, and it went to the firms in form of profit.

Cycle 2

The public immediately makes loan payment of 65,1 dollars and another 646,443 dollars is reduced by taxes. Now the public is left with only 8588,457 dollars as purchase ability, missing 1411,54 dollars in order to buy all the products.

Now in the bank we have 700 dollars from the previous cycle, and additional 65,1 dollars of loan payments and 646,443 of taxes that were deposited in this current cycle. Meaning a total of 1411,54 dollars available for loan, exactly same amount that is needed for purchasing the remaining goods. So the public borrows this money and purchases the remaining goods, and we end the cycle again with same 700 dollars deposited in the bank that is firms' aggregate profit. This time no new injection was needed.

/

Now we can look at the C table and see that we can go on like this forever, with public making loan payments, tax payments, and firms able to make 7% profit with no need of new money injection each cycle.

So we no longer need injection? The public may borrow same money over and over again. But that comes at a price, we have created a very unstable bubble that can burst the moment that firms or government try to withdraw some of the money.

If you look at "virtual" columns, in the 25th cycle (appearing last) both government and firms see a total of 29719,3 dollars appearing on their accounts, while there is actually only 700 dollars present.

Now without the loaning option and taxes, the government would have to inject money every cycle, 25*700= 17500 dollars in total to cover the Firms' profits. And if you add

public taxes, that is additional 12219,3 dollars needed to be injected to cover for the aggregate purchasing ability decrease.

Back to our example, the debt will only continue to grow, and the public will never be able to repay it. Of course the public can decrease its spending and use part of its salary to start repaying the loans, but then we will need the government to inject new money to compensate the public spending decrease.

So as you see, the phenomena of banks loaning money doesn't create the need for additional money injection. On the contrary, it creates a bubble that allows the government not to inject money, at least for a while.

Ok this example was weird, let's use more realistic example.

Table C1

| pub inc | loan rep | a.p.p.a | 9 firm | smart firm | injection l | inj dir | loaned | bank inc | 9 firm dep | 1 firm dep | pub dep | end m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9300 | 0 | 9300 | 9000 | 1000 | 70 | 0 | 1000 | 0 | 630 | 70 | 300 | 70 |
| 9300 | 110 | 9190 | 9000 | 1000 | 0 | 0 | 1000 | 10 | 630 | 70 | 190 | 70 |
| 9300 | 220 | 9080 | 9000 | 1000 | 0 | 0 | 1000 | 20 | 630 | 70 | 80 | 70 |
| 9300 | 330 | 8970 | 9000 | 1000 | 0 | 30 | 1000 | 30 | 630 | 70 | 0 | 100 |
| 9300 | 440 | 8860 | 9000 | 1000 | 0 | 140 | 1000 | 40 | 630 | 70 | 0 | 240 |
| 9300 | 550 | 8750 | 9000 | 1000 | 0 | 250 | 1000 | 50 | 630 | 70 | 0 | 490 |
| 9300 | 660 | 8640 | 9000 | 1000 | 0 | 360 | 1000 | 60 | 630 | 70 | 0 | 850 |
| 9300 | 770 | 8530 | 9000 | 1000 | 0 | 470 | 1000 | 70 | 630 | 70 | 0 | 1320 |
| 9300 | 880 | 8420 | 9000 | 1000 | 0 | 580 | 1000 | 80 | 630 | 70 | 0 | 1900 |
| 9300 | 990 | 8310 | 9000 | 1000 | 0 | 690 | 1000 | 90 | 630 | 70 | 0 | 2590 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 3390 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 4190 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 4990 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 5790 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 6590 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 7390 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 8190 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 8990 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 9790 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 10590 |

pub inc = public income ; loan rep= loan repayment

smart firm = smartphone firm ; 9 firms = "regular" firms

injection l= injection by loan ; inj dir = injection by direct purchase

bank inc = bank income

dep = deposit (1 firm = smartphone firm, pub = public)

end m= real money in bank at the end of the cycle

Again we have 10 firms, with 10 employees each, with each employee earning 93 dollars. We have 9 firms that produce "regular" products and one firm that produces smartphones. Now all firms have a synchronized cycle of one month.

The smartphone company produces only 10 units each cycle, so only 10 people can buy it each cycle. Let's divide our population in groups of 10, and every cycle a different group will purchase the smartphones.

Now let's define our public purchasing pattern. The public after receiving the salary, first will always make loan payments. Then public will purchase regular products that are available.

Then a different group of 10 people will borrow money from the bank in order to purchase smartphones.

The loan conditions are that a person has to make monthly 10% payments, plus 1% of interest rate (if you borrowed 100 dollars, then you have to pay 11 dollars for 10 months).

Also smartphones are only good for 10 months, after that they break and people have to buy new ones. Meaning that a person purchases a phone in the end of first cycle, his first payment will be in the second cycle and the last payment in 11th cycle. In the 11th cycle the smartphone will break, so the person immediately buys a new one in same cycle, and starts making loan payments again in the 12th cycle… ok?

Also there is no option for down payment for the smartphone, you have to loan the whole sum. And also the government in order to avoid an unstable bubble, passes a law that no person can have more than one loan at any moment.

Simulation

/

Cycle 1

Public receives 9300 dollars' salary and purchases 9000 dollars' worth of regular goods, and the remaining 300 dollars are deposited in the bank. Now in the bank we have 300 dollars plus additional 630 dollars that the regular firms just deposited as profit, so 930 dollars are available for loan. We are still missing 70 dollars, so the government simply deposits this amount in the bank. Now a group of 10 people borrows this money (1000 dollars) and purchases smartphones, and the smartphone firm deposits 70 dollars' profit in the bank, and that's the amount of real money that we finish the cycle with.

Cycle 2

The first group of 10 people makes a loan payment of 110 dollars, the public then purchases 9000 dollars' worth of goods and deposits the remaining 190 in the bank.

Now the second group of 10 people wants to purchase smartphones. We have in the bank 70 dollars from previous cycle, 630 dollars of regular firms' profit, 190 dollars deposited by the public, 110 dollars of loan repayments, so in total 1000 dollars. The second group now will borrow this 1000 dollars and buy 10 smartphones, no need for government injection, the smartphone firm will make 70 dollars' profit and deposit it in the bank, so we finish the cycle with same amount of real money in the bank that we started with.

/

Now as you see we can go on like this till the fourth cycles, then the loan repayments will reduce the public aggregate purchasing ability to lower than 9000 dollars. That will force the government to make direct purchase of the regular products.

We see that in the 11th cycle all public will be in debt, making regular 1100 loan repayments, and the government having to inject 800 dollars each cycle.

Now let's see what is going on in the 20th cycle.

Now in 20th cycle we have a total amount of 10590 of real money, and that is the same amount the government had to inject overall.

Now in a bankless version, we would have to inject 700 dollars each cycle, making it total of 14000 dollars after 20 cycles.

So we have a difference of 3410 dollars between the two versions, so where did this money go? I think it's in a bubble.

In our C1 example you can see that the firms have deposited 700 dollars each cycle, so they supposed to see a total of 14000 dollars on their accounts. Also the bank sees 1450 dollars of income from interest rates, also employees see 570 dollars on their account. Don't forget that the government deposited 70 dollars in first cycle, so in total the virtual money is 16090 dollars, and real money is 10590 dollars. That means that the public supposed to have 5500 dollars of loaned money on its hands. And that makes sense, since all the public in debt and every group of 10 people is in different stage of repayments (100+200+300+400+500+600+700+800+900+1000= 5500 dollars of aggregate debt).

So basically we have 10590 of real money, we remove 1450 of bank profits and add 5500 dollars that are in the bubble, we get 14640 dollars, that is very close to 14000 dollars in the bankless version. There is a distortion that causes this inaccuracy of 640 dollars, it's because in our example the public wasn't able to spend its 570 dollars in first three cycles and had to loan it (300+190+80), and also the goverment had to deposit 70 dollars in the first month.

But don't let it bother you, let's continue our simulation. Let's say that after the 20th cycle the smartphones don't break anymore, so no one borrows money anymore, and the smartphone firm is immediately converted into regular firm (the "9 firm" column actually becomes "10 firm" column after 20th cycle, and so does the "9 firm dep").

Table C2

| pub inc | loan rep | a.p.p.a. | 9 firms | smart firm | injection I | inj dir | loaned | bank inc | 9 firm dep | 1 firm dep | pub dep | end m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9300 | 0 | 9300 | 9000 | 1000 | 70 | | 1000 | 0 | 630 | 70 | 300 | 70 |
| 9300 | 110 | 9190 | 9000 | 1000 | 0 | 0 | 1000 | 10 | 630 | 70 | 190 | 70 |
| 9300 | 220 | 9080 | 9000 | 1000 | 0 | 0 | 1000 | 20 | 630 | 70 | 80 | 70 |
| 9300 | 330 | 8970 | 9000 | 1000 | 0 | 30 | 1000 | 30 | 630 | 70 | 0 | 100 |
| 9300 | 440 | 8860 | 9000 | 1000 | 0 | 140 | 1000 | 40 | 630 | 70 | 0 | 240 |
| 9300 | 550 | 8750 | 9000 | 1000 | 0 | 250 | 1000 | 50 | 630 | 70 | 0 | 490 |
| 9300 | 660 | 8640 | 9000 | 1000 | 0 | 360 | 1000 | 60 | 630 | 70 | 0 | 850 |
| 9300 | 770 | 8530 | 9000 | 1000 | 0 | 470 | 1000 | 70 | 630 | 70 | 0 | 1320 |
| 9300 | 880 | 8420 | 9000 | 1000 | 0 | 580 | 1000 | 80 | 630 | 70 | 0 | 1900 |
| 9300 | 990 | 8310 | 9000 | 1000 | 0 | 690 | 1000 | 90 | 630 | 70 | 0 | 2590 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 3390 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 4190 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 4990 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 5790 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 6590 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 7390 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 8190 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 8990 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 9790 |
| 9300 | 1100 | 8200 | 9000 | 1000 | 0 | 800 | 1000 | 100 | 630 | 70 | 0 | 10590 |
| 9300 | 1100 | 8200 | 10000 | 0 | | 1800 | 0 | 100 | 700 | 0 | 0 | 12390 |
| 9300 | 990 | 8310 | 10000 | 0 | | 1690 | 0 | 90 | 700 | 0 | 0 | 14080 |
| 9300 | 880 | 8420 | 10000 | 0 | | 1580 | 0 | 80 | 700 | 0 | 0 | 15660 |
| 9300 | 770 | 8530 | 10000 | 0 | | 1470 | 0 | 70 | 700 | 0 | 0 | 17130 |
| 9300 | 660 | 8640 | 10000 | 0 | | 1360 | 0 | 60 | 700 | 0 | 0 | 18490 |
| 9300 | 550 | 8750 | 10000 | 0 | | 1250 | 0 | 50 | 700 | 0 | 0 | 19740 |
| 9300 | 440 | 8860 | 10000 | 0 | | 1140 | 0 | 40 | 700 | 0 | 0 | 20880 |
| 9300 | 330 | 8970 | 10000 | 0 | | 1030 | 0 | 30 | 700 | 0 | 0 | 21910 |
| 9300 | 220 | 9080 | 10000 | 0 | | 920 | 0 | 20 | 700 | 0 | 80 | 22830 |
| 9300 | 110 | 9190 | 10000 | 0 | | 810 | 0 | 10 | 700 | 0 | 190 | 23640 |

As you see the 21st cycle is when the first group of 10 people make its last loan payment, and nobody borrows money anymore.

Now let's see what happens in 30th cycle.

Total real money = Injected Money = 23640 dollars

Bank profit = 2000 dollars

In bankless version we would have 700*30= 21000 dollars.

In our bank example, if we remove the 2000 dollars of bank profit, we will have 21640 dollars.

So we have a difference of 640 dollars. I think that is because in first 3 cycles the public didn't spend its 570 dollars (300+190+80), and had to borrow it from itself through the bank. Also the government had to deposit 70 dollars in first cycle, it appears as injection, but that's a little bit misleading. The government didn't actually purchase any goods, but loaned money to the public that later was repaid.

In a bankless version if we assume that we have 10 regular firms from the beginning, then the public would be able to spend its 570 dollars, and the government would inject money by direct purchase, and not deposit 70 dollars to be used as a loan. So the 640 dollars' distortion makes sense.

Either way as you see, the bank loaning money overall didn't create the need to inject new money significantly more than in a bankless scenario. Only 2640 dollars more, which is slightly bigger than 10% of all injected new money amount. And if we ignore the 640 dollars, then it is even less than 10%.

We can program it without the 640 dollars' distortion. The government may simply retract it's 70 dollars in later cycles, and the public may spend the saved 570 dollars on regular products also in later cycles, decreasing the amount of needed injection by same amount. So the only difference would be 2000 dollars between bank and bankless versions.

So I don't know why they teach in schools that banks create new money by loaning. They are not. The bank interest rates that made the government to inject additional 2000 dollars, is no different from the effect of profit of any firm. Banks interest rates are no different from regular profit that any other firm makes, and require injection of new money same way.

I never understood why people say that banks create new money by loaning. We don't say that landlords "create new apartments" when they rent out their apartments for profit, so what's the difference?

Of course what is very important is the bubble effect that the loan creates. The bubble in C2 has an upside down U shape, so the government needs to monitor the dynamic and inject new money accordingly.

If the government ignores it and just inject 700 (or 800) dollars as usually each cycle, then initially in cycles 0–11 it will cause an inflation, and in cycles 21–30 a deflation.

Also the government needs to see the effective way it injects money, whether by direct purchases or increasing bank's deposits so there will be more money available for loaning.

But the banks do not create new money, and on the contrary they are more like shock absorbers. By allowing people who ran out of money to borrow, it lets the government some time to monitor the situation and think how to respond.

The charged interest rates do create the demand for new money, but no differently from any other profit in the economy.

So we may add an equation, for each cycle:

I= P — (loaned money) + (loan repayments)

At each cycle the injection equals the profit minus all the purchases that were made by loaned money plus all the loan repayments.

Some remarks:

- Notice that this formula doesn't work for the first cycle in C1 example. I think it depends on if we use the 70 dollars' injection as a loan or as a direct purchase. If we use it as a loan, then our formula will be I = 1000–1000+0. If we use it as direct purchase of the regular products, then our formula will be

I = 1070–1000+0=70 (because public profit increased by 70, due to regular products reduced to 830 dollars after government direct purchase).

It doesn't work when injection is a loan, because the formula considers the final state of the profit being 1000 dollars. But when we apply it during the cycle, there is actually only 930 dollars' profit (public + regular firms' deposits).

I guess maybe we can apply this formula only when the sum of needed loan is lower than the available deposits, otherwise the formula may be misleading, especially if the needed injection is in form of loan.

I noticed this problem with the formula only occurs in the first cycle, so keep an eye on it.

- Also keep in mind that by "loaned money" in the formula I mean purchases that are being made with loaned money in a specific cycle, if you just borrow money and don't use it, then it won't appear in the formula. It will still be part of "profit" (P).

- Also keep in mind not to use the bank profit twice. The interest rate can be part of "P" or part of "loan repayments", whatever you want, but not both of them.

- Also we defined injection as "introducing new money", and not returning old money to the circulation. But what about that 70 dollars that the government deposited in the first cycle and later I offered to retract it. If we retract it, and then return it, would it be considered as returning old money or injection of new money? Technically that will be an injection. We needed that 70 dollars only to allow to the public to borrow it, and once it was repaid, it has no role in circulation. So there may be exceptions where a government may retract unused money, and later inject it as new money.

Now you may ask, does it mean that my initial formula I=P no longer works? Not exactly, if you consider a loan as a "suspended profit" that is currently is being used by someone else as expenditure, then it's temporarily not profit, and I=P still applies (loan repayment is a restoration of the suspended profit).

# Timeframes, unsynchronized cycles and "suspended expenditure"

## -suspended expenditure-

Table D

| workers | mechanic | a.p.p.a | firm a | Injection | pair a | total work | tot w dep | tot fir dep |
|---|---|---|---|---|---|---|---|---|
| 1860 | 130,2 | 1860 | 2000 | 140 | 82,82 | 4000 | 130,2 | 140 |
| 1860 | 130,2 | 1860 | 2000 | 140 | 95,84 | 4000 | 130,2 | 140 |
| 1860 | 130,2 | 1860 | 2000 | 140 | 108,86 | 4000 | 130,2 | 140 |
| 1860 | 130,2 | 1860 | 2000 | 140 | 121,88 | 4000 | 130,2 | 140 |
| 1860 | 130,2 | 1860 | 2000 | 140 | 134,9 | 4000 | 130,2 | 140 |
| 1860 | 130,2 | 1860 | 2000 | 140 | 147,92 | 4000 | 130,2 | 140 |
| 1860 | 130,2 | 1860 | 2000 | 140 | 160,94 | 4000 | 130,2 | 140 |
| 1860 | 130,2 | 1860 | 2000 | 140 | 173,96 | 4000 | 130,2 | 140 |
| 1860 | 130,2 | 1860 | 2000 | 140 | 186,98 | 4000 | 130,2 | 140 |
| 1860 | 130,2 | 1860 | 2000 | 140 | 200 | 4000 | 130,2 | 140 |
| 1860 | 130,2 | 1860 | 2000 | 140 | 82,82 | 4000 | 130,2 | 140 |

Tot w dep = total workers deposit ; tot fir dep = total firms deposit

Total work = total money on workers' accounts

tot w dep = total workers' money deposited in the current cycle

Let's say we have a firm A with 20 workers, all earning same salary (manager defined as a worker and earns the same).

Each worker earns 93 dollars, and he will never spend more than 86,49 dollars on firm A's products, and deposit the remaining 6,51 dollars in the bank. Also each worker starts with 200 dollars in his account.

Each worker has a car, and once in 10 months it has to undergo a repairment in a garage.

We have a garage with only one mechanic who is also the owner, the mechanic can repair two cars each month. The mechanic charges 65,10 dollars for each car. The mechanic also has a car, but he repairs it for free so it doesn't appear in the table.

The mechanics spends all his earnings on firm's A products and doesn't make any profit.

All firms have a synchronized cycle of one month (firm A and the garage).

Now by looking at the D table we see that the total profit each cycle is 270,2 dollars but the injection is only 140 dollars.

Each cycle a different pair of workers take their car to the garage, and they pay only with saved money from the bank account. We see that the column "pair a" follows the first pair total saved money, and that it restores to its initial state of 200 dollars right before the next garage visit.

Also the "total work" column shows that the total amount of all the 20 workers' money doesn't change each cycle.

So how can we explain it from the I=P perspective?

Each cycle 20 workers collectively deposit 130,2 dollars, while two individual workers withdraw 130,2 dollars. And of course we have firm A 140 dollars of profit.

Well the thing is that workers deposited money is not exactly a profit, but a "suspended expenditure". Previously we discovered that a purchase made with a loan is an expenditure that is also a suspended profit, now we discover that it can be the other way, a profit can be a suspended expenditure.

So how the government can know? How can we know what earned money is profit, and what is a suspended expenditure? Well I guess we can't know. Even the people who put money aside aren't sure how they are going to use it in the future.

Now we can think about a method that a government can use in order to know what amount of money to inject. For example the equation:

(aggregate prices) — (aggregate salaries) = I

In our case it's (2130,2) — (1990,2) = 140 dollars. Which is the exact amount the government needs to inject. Keep in mind that the mechanic appears twice, both in "agg prices" and "agg salaries". In fact the mechanic doesn't influence at all on the numbers, so you can remove him all together and nothing changes. (Nothing changes in the numbers world, but in the real world people's cars will break and not ride anymore).

Of course if the mechanic would decide to make profit from his earnings, then the government would have to inject an additional equal amount of money.

But will this equation ("agg prices — agg salaries") always work? Let's see another example.

Table D1

| pub inc | | firm a | firm b | inj | pub dep | firm a | firm b | | real m |
|---|---|---|---|---|---|---|---|---|---|
| 1140 | | 1000 | | | 140 | 70 | 0 | | 210 |
| 1140 | | 1000 | | | 140 | 70 | 0 | | 420 |
| 1140 | | 1000 | | | 140 | 70 | 0 | | 630 |
| 1140 | | 1000 | | | 140 | 70 | 0 | | 840 |
| 1140 | | 1000 | 1129,03 | 429,03 | 0 | 70 | 79,0321 | | 429,0321 |
| 1140 | | 1000 | | | 140 | 70 | 0 | | 639,0321 |
| 1140 | | 1000 | | | 140 | 70 | 0 | | 849,0321 |
| 1140 | | 1000 | | | 140 | 70 | 0 | | 1059,032 |
| 1140 | | 1000 | | | 140 | 70 | 0 | | 1269,032 |
| 1140 | | 1000 | 1129,03 | 429,03 | 0 | 70 | 79,0321 | | 858,0642 |

pub inc = public income ; inj = injection

pub dep = public deposit ; real m = real money

Now we have two firms, firm A has 10 employees with a total salary of 930 dollars and a cycle of one month.

Firm B has only two employees, a manager and a worker, with a total salary of 210 dollars a month. Also firm B cycle is 5 months long, meaning it takes it 5 months to get its product to market and then it is immediately purchased by the public. But the firm still has to pay employees a salary each month.

Both firms make 7% profit from sales. Also the public will try to purchase all the available goods on the market, there is no loans but public can withdraw its savings.

Now in first 4 months, both the public and firm A making 210 dollars' profit, but still we don't need injection.

In the fifth month when firm B tries to sell its products, the public doesn't have enough money to purchase all of them and the government has to inject 429,03 dollars.

So how do we explain it in terms of I = P?

The first four months the P was 210 and still the injection was 0. P = 210 ; I=0.

In the fifth month the profit was 149,0321 dollars, but the injection was 429,03 dollars.

So for the first four months: P = 210 dollars, I = 0 dollars.

Fifth month: P = 149,0321 dollars, I = 429,03 dollars.

So once again some of our profit is really a suspended expenditure.

Let's use (agg prices) — (agg salaries):

first four months 1000–1140= -140 dollars (for each month).

fifth month: 2129,03–1140 = 989,03 dollars.

So we see that the equation I=P=(agg prices) — (agg salaries) doesn't work in this example.

Why? Because our cycles are not synchronized. Each month we have one firm A cycle, and a fifth of firm B cycle.

Now if we had a synchronized cycle like this:

Table D2

| pub inc | | firm a | firm b | inj | pub dep | firm a | firm b | | real m |
|---------|---|--------|--------|-----|---------|--------|--------|---|--------|
| 1140 | | 1000 | 225,806 | 85,806 | 0 | 70 | 15,80642 | | 85,80642 |
| 1140 | | 1000 | 225,806 | 85,806 | 0 | 70 | 15,80642 | | 171,6128 |
| 1140 | | 1000 | 225,806 | 85,806 | 0 | 70 | 15,80642 | | 257,4193 |
| 1140 | | 1000 | 225,806 | 85,806 | 0 | 70 | 15,80642 | | 343,2257 |
| 1140 | | 1000 | 225,806 | 85,806 | 0 | 70 | 15,80642 | | 429,0321 |
| 1140 | | 1000 | 225,806 | 85,806 | 0 | 70 | 15,80642 | | 514,8385 |
| 1140 | | 1000 | 225,806 | 85,806 | 0 | 70 | 15,80642 | | 600,6449 |
| 1140 | | 1000 | 225,806 | 85,806 | 0 | 70 | 15,80642 | | 686,4514 |
| 1140 | | 1000 | 225,806 | 85,806 | 0 | 70 | 15,80642 | | 772,2578 |
| 1140 | | 1000 | 225,806 | 85,806 | 0 | 70 | 15,80642 | | 858,0642 |

…then we wouldn't have any problem. The government would simply inject 85,806 dollars each month.

Back to D1… so how we solve this problem?

How the government should know how much money to inject? It doesn't know what saved money is profit and what is suspended expenditure, the previous equation of "agg prices"- "agg salaries" doesn't work anymore, it was only good for synchronized cycles.

How about another equation:

(aggregate prices) — (aggregate public spending) =?

For first four months: 1000–1000=0 dollars (each month)

Fifth month: 2129,03–1700= 429,03 dollars.

So looks good enough, this is what the government had to inject.

So does it mean I = P is no longer working? Not exactly. I = P only works in a synchronized cycle, when we also can distinguish between true profit and a suspended profit (loan) or a suspended expenditure.

Overall if you look at 5 months, the formula I=P works, it's I=P= 429,03 dollars.

And if the firm B would sell their products every month we would have no problem, just like D2 shows.

But we know that in real world it doesn't work like in D2, it works more like in D1. Meaning that firms don't work in a single synchronized cycle. Sometimes it's even hard to measure when one cycle starts and ends. Some products have short purchase period, like milk or vegetables, another products have a very long purchase period, like nails or canned food.

Some firms getting paid frequently, like a taxi cab or a barber, other firms may wait long period before they get paid, like construction companies, it may take few years to build an apartments building and sell it to costumers.

So in real world there is no such thing as a "synchronized cycle", and therefore the I=P formula is not easily applicable, even though still being true. The problem of (aggregate prices) > (aggregate public purchasing ability) is still remains.

Also it's a big problem for government to know what part of saved money is profit, and what part is only a "suspended expenditure" (and also suspended profit, aka loan).

We may use additional tools to help us to know how much money to inject, tools like equations ("agg prices" — "agg salaries"), or ("agg prices" — "agg public spending").

Also there is a problem of "irrational behavior" by the participants, both the firms and the public. Take for example D1 scenario. Now technically if the government to directly purchase 85,806 dollars' worth of firm's A products each month, there will be less of it for the public to buy, so the public will save additional 85,806 dollars each month. That way in fifth cycle the government will have to inject only same 85, 806 dollars, instead of the 429,03 dollars. So you may claim that we don't need all this stuff of "suspended profit" and "unsynchronized cycles".

But the thing is that in the real world participants may behave irrationally, since each month people will have money left, they will try to purchase additional firm A's products, so firm A may respond by raising prices. So you have an inflation, and if the government to inject additional 85,806 dollars by direct purchasing, it will only add to inflation. And now in fifth cycle the government will have to inject even more than 429,03 dollars.

Of course we may have an inflation even without the monthly injection of 85,806 dollars, if the public simply tries to spend the additional 140 dollars that he is left with. Then the government should perhaps try to regulate the irrational behavior by limiting the prices for firm A's products (1000 dollars only each month), or by taxing the participants and then use these taxes in fifth cycle for direct purchase (as I said before, spending tax money doesn't replace the need for injection of new money).

But also there is another important issue of choosing a time frame, since in real economy with thousands of operating firms, there is no such thing as "one cycle time period". The government has to choose a specific time period that it would work with. We already established how it is important to inject the right amount of money in the right time and by the right method (loan or purchase). Let's look on the next example.

Table D3

| pub pur a | firm a | firm b | firm c | firm d | injection | pub t dep | f dep |
|---|---|---|---|---|---|---|---|
| 1891 | 1000 | | | | | 891 | 70 |
| 1891 | 1000 | 1000 | | | | 782 | 140 |
| 1891 | 1000 | | 900 | | | 773 | 133 |
| 1891 | 1000 | 1000 | | | | 664 | 140 |
| 1891 | 1000 | | | 1000 | | 555 | 140 |
| 1891 | 1000 | 1000 | 900 | | 454 | 0 | 203 |
| 1891 | 1000 | | | | | 891 | 70 |
| 1891 | 1000 | 1000 | | | | 782 | 140 |
| 1891 | 1000 | | 900 | | | 773 | 133 |
| 1891 | 1000 | 1000 | | 1000 | 336 | 0 | 210 |

pub t dep = public total deposits f dep = firms deposits each cycle

Let's say we have four firms. All firms pay the same to all employees, 93 dollars each.

Firm A has 10 employees and a cycle of one month.

Firm B has 5 employees and a cycle of two months.

Firm C has 3 employees and a cycle of 3 months.

Firm D has 2 employees and a cycle of 5 months.

All the firms pay salaries every month, but sell their products only in the last month of their cycle (firm A sells its products every month). All firms work for 7% profit from sales.

No loans available, the employees will try to purchase all the available goods that are on the market, including with saved money from the bank account.

So without going into much details, you can clearly see that even the circulation is usually sustainable most of the time, occasionally it has what I call "negative time frame". In our table it's the 6th and the 10th month, it's when we need the government to inject new money.

Remember in the beginning I said that without injections, the firms will always be in a state of earning same amount that they spend on labor, with their balance being a zero? Now this table shows that even breaking even may be impossible, because of "irrational" behavior by the participants. Many customers are used to spend money when they have it, people usually don't think "I should save now, so I could purchase some product from 2 months from now". It depends of course on the product and on each specific person, some people may behave like that, but some don't. No one will think "I will buy only one chocolate bar right now instead of two, so in 3 month I can buy some chewing gum".

Anyway I think the D3 table clearly shows that it is very unlikely to firms even to break even due to irrational behavior, without government injections.

Now the government has to define a time frame that it will be working with. For example if it decides to use 2 month frame, then it won't be effective. If the government reacts in the 6th month to what have happened in the 5th month, then it may be too late, the damage already done.

Especially look at the firm D, it has 0 savings since it hasn't made any sales yet in previous months, so if it won't be able to earn back its labor expenditure (maximum loss of 454 dollars), it will reduce its ability to restart the next cycle due to inability to pay salaries. And it's important to notice that this failure in our example may not be firm D's fault, but it is government's fault if it didn't inject the new money on time.

The government's duty of injection of new money is not a privilege or act of good will, but an economic necessity and even government's obligation towards the citizens.

So it looks like the best time frame here is one month, and we use the equation:

I= (aggregate prices) — (aggregate public spending)

6th month: 3000–2346 = 654 dollars.

10th month: 3000–2564 = 436 dollars.

So it makes sense.

Notice that in real world the equation ("agg prices" — " agg public spending") is good after the fact, and may be not that effective. Meaning if the government use it in the end of a time frame, then it may not have enough time to make an effective injection.

That's why the banks are so important, and that's why I called them shock absorbers. Banks would allow the public to borrow money in the negative time frames and make purchases, preventing or reducing the damage. But that also depends on type of products, some products people simply won't buy if they don't have money, not even with a loan being available (like luxury products, or hotel vacation).

**Additional cases**

Now in my mind I=P is a golden rule, that cannot be avoided. But let's talk about additional scenarios:

**-Contraction and expansion of the economy-**

Let's talk about contraction first, let's bring back the A table.

| Firm A | Firm B | Firm C | Firm D | Firm E | Firm F | a.p.p.a | f.a.p.p | injection |
|---|---|---|---|---|---|---|---|---|
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |

Contraction doesn't necessarily mean a bad thing. Let's say Firm A made a scientific discovery that allowed it to produce same amount of goods with only half of the workers.

So in the next cycle our a.p.p.a. will be 5115 dollars (let's assume all employees have same salary), and f.a.p.p will be 5500 dollars. Now the injection needed is only 385 dollars.

Expansion.

Let's say Firm A after a certain amount of cycles will use its accumulated profit to invest and build a new firm. Let's call the new firm "Firm G", with also 10 employees with same salary, same profit and same cycle. Now the initial one-time investment is of course a conversion of accumulated profit into an expenditure.

And after that we simply added another firm, so our a.p.p.a. is increased by 930, f.a.p.p. is increased by 1000, and injection now needs to be 490 dollars.

Now those two examples are simple ones, and the I=P golden rule still holds.

But we should later also check more complicated scenarios, contractions/expansions that happen in the middle of a loan bubble or an expected negative time frame. It may have some nuances, but overall it looks like I=P rule is still valid.

**-Trade-**

Well of course international trade will affect the I=P rule, but not cancel it. I don't think it's that important so I don't want to waste too much time on it. It doesn't matter if you divide the world economy into several sub economies.

But ok let's bring it, why not:

| Firm A | Firm B | Firm C | Firm D | Firm E | Firm F | a.p.p.a | f.a.p.p | injection |
|--------|--------|--------|--------|--------|--------|---------|---------|-----------|
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 |

Here we again with A table.

Let's say all Firm F products go to export, and this economy doesn't import anything else in return (positive balance).

So now our f.a.p.p. equals to 5000, and the public saves 580 dollars each month and we don't need to inject new money anymore.

Now let's say we have identical economy that imports all those products, it also has 6 firms and a.p.p.a. of 5580 and f.a.p.p. of 6000 +1000 dollars (let's say it was originally euros, but we convert it into dollars' worth).

Well it's pretty obvious that the importing government now has to inject 1000 dollars more, making it 1420 dollars in total each month.

Either way it doesn't change the I=P golden rule. Of course maybe the importing economy has a lot of saved profit, and its public purchases the import goods with it… ok, but it is a matter of time before they run out of the accumulated profit and the government will have to inject 1420 dollars' worth of new money each month.

P.S. Someone told me once that Rosa Luxemburg had thought of this problem. She claimed that because capitalists add value to products, the only way to satisfy it is by invading another countries and forcing them to purchase those products. Let's just say her thinking about this problem was correct, but not the solution she provided. All that the government needs to do, is to periodically inject new money into circulation.

### -Irrational Behavior-

I already mentioned it. Irrational doesn't mean necessarily irrational per se, it may be perfectly rational from the individual point of view, but it will be harmful in terms of the big picture and the effectiveness of circulation in long term.

Firms may have tendencies to increase prices, public may spend too much money in one month, and for some reason spend too little in another month.

The government may use tools to regulate this behavior, like taxes, price caps, and using tax money for purchases and loans (I can't stress this enough, spending previously collected tax money is not injection of new money!!!).

Also banks may create unstable loan bubble. So the government may have to bail them, or make them keep reserves, or make borrowers deposit a down payment.

The irrational behavior makes it more difficult for the government, but it doesn't change the validity of the I=P golden rule.

### -Delayed Revenue-

Now this is something that may cause us some trouble. In all my simulations, all the goods from each firm were sold in on month. Meaning that a firm has always a beginning and an end of a cycle. But what about firms that don't have exact cycles. A canning factory may produce 1000 units in a month, and then this product may sit on stores shelves for years. This messes up our equation:

I = (aggregate prices) — (public aggregate spending)

Why? Because can food is not supposed to be consumed in same month it was produced. So when the government uses this equation during a defined time frame, it may define the can food as excessive product and purchase it with injected new money, when in reality it's a "delayed revenue" product, that is supposed to have long purchase time.

So purchasing it with injected new money may have a few negative effects.

It will send a wrong signal to the canning factory, the owner will think there is a high demand for his product and he may increase production. Of course eventually the government will understand that it's making a mistake by purchasing all this can food.

Also it may cause a needless increase of money in circulation and cause irrational behavior, like inflation.

So how does the government tell apart excessive products, redundant products and delayed revenue products? I guess there is no accurate way to do this. I can't think of any mathematical way to differentiate between those 3.

There is a possibility of calculated guess of course. The government may use statistics from the past, and divide products into different groups. Also maybe the government should better study the public and its preferences, in order to be able to predict its purchasing patterns. It's the public purchasing patterns that define whether a product is excessive, redundant or "delayed".

Maybe also divide products by their expected purchase time durations? For example bread is supposed to be purchased in a week, but canned food may be purchased during a whole year and even longer.

I guess this is where economics meets marketing. In our simulation we programmed the behavior of all the participants, when in real life it may be not so easy to know what people will do, and additional tools needed to be used to help make predictions and calculated guesses.

But still the golden rule I=P is always valid, even though the "delayed revenue" makes it harder to evaluate since we lose the accuracy of the ("agg prices"-"agg public spending") equation.

### -Natural bankruptcy and redundant products-

And of course some firms supposed to go bankrupt and lose money, and their products are redundant and are not supposed to be purchased.

But how to differentiate a firm that is simply experiencing a negative time frame, and its products are not purchased because of government's incompetence and inability to perform a correct injection, from a firm that is naturally dying?

And also naturally dying firms release money to the circulation due to losses, reducing the amount needed to be injected by the government.

Of course there is no simple answer. I suppose the government should make a calculated guess.

# Conclusion

I=P is our golden rule. Whenever a product or service is being made, it also creates a price and a purchasing ability, and those two have to match in order for the product to be purchased.

If we want this process to produce monetary profit for the producer or for the employee, then the price has to be above the purchasing ability, therefore they could never match.

If we establish that it is the greater good and even necessity for monetary profit to be made, then the government has to step in and regularly inject new money into circulation.

And it's not like the government hands out free cash when it injects new money, no, it allows to monetize the excessive goods, according to their current market price.

The injection is not handing out free money, injection is a solution to a problem of the circulation mechanism… or whatever you want to call it.

If the injection performed correctly, it supposed to allow an effective circulation and exchange of money for goods and services.

And it's not only a matter of the "greater good"… if the government is the only institution allowed to print money, and it is its duty to provide money to be used as a tool of exchange… then by definition it is government's obligation to inject new money so that the excessive products could be monetized.

No "profit-based" economy is possible without regular new money injection:

all profit possible = new money injection

P=I

There are slight temporally exceptions and deviations, but in the long run the P=I rule is valid.

Therefore we arrive to conclusions:

-The yearly GDP will most likely always be above the yearly public aggregate purchasing ability, excluding positive trade balance.

-Banks do not create new money, the loaning creates a bubble that temporally distorts the amount of new money that needs to be injected, but in the long term it has no effect. Banks do create a demand for new money by charging interest rates, but that is no different from any other firm that makes monetary profit from its product.

I didn't mention the stock market, but I guess it is no different from the bank activity. People loaning each other money for an obligation to be paid back in the future, hopefully with additional profit.

-It's the government obligation to effectively inject new money into circulation in order to ensure an effective purchase of the produced goods.

Now is it possible to use the I=P rule effectively in the real world?

It's hard to tell, due to a number of reasons. There is no doubt that this problem of I=P exists, and demands from the government to inject new money, but there are many challenges that make it hard to do effectively:

- A large amount of data and difficulty to collect it. In real world there are thousands and thousands of firms, and millions of employees. That poses a problem for the government to collect all the data about the activity of all the participants.

- Defining an effective time frame to work with. A week, a month, a quarter?

- Differentiating between profit, suspended profit (loan) and suspended expenditure. In real world the term "profit" may be meaningless, we may replace it with "saved money" or "unused money", that at any time can be converted by its holder into expenditure.

Also we need to differentiate between active loan and inactive loan (was there a purchase made with the loaned money or not).

Because of this, the biggest problem is that no matter what time frame length we choose, it will not contain all the information that will allow to calculate the exact amount of new money that is needed to be injected. Each time frame is connected and affected by past and future time frames.

- Differentiating between a firm that is experiencing negative time frame, and a firm that is naturally dying.

- Differentiating between excessive goods, redundant goods and delayed goods.

- Predicting and regulating irrational behavior and purchasing patterns. Now the government has the power to decide who will make profit and in what amount. Government's injection policy may be also affected by ideological or political considerations, instead of strictly economical… and that's not good.

- Predicting contractions and expansions of the economy.

- Predicting export/import balance.

- Monitoring the loan bubble dynamic, and adjusting the injection amount accordingly.

- Choosing the right injection method: direct and indirect purchase, loaning money, bailing banks (going to talk about this problem shortly).

Now in our simulations we programed the behavior of all the participants, in real world we would have to predict all this behavior. In the real world the government may not allow itself to wait and react, but it will have to predict and take preventive actions. Meaning if the government expects a specific time frame to be negative for certain firms, it may have start to inject new money some time before this specific time frame actually begins.

Now I want to talk about another challenge for the government, of choosing the correct injection method. I can think about three main methods:

- Increasing available money for loaning. Government can do this by loaning new money to the banks, or simply depositing new money on bank accounts. Also bailing out banks if the loan bubble became unstable and people can't withdraw their money. Keep in mind that unstable bubble burst is not necessarily banks' fault, and actually can be the government fault for not performing correct injections in previous time frames.

- Direct purchase with new money. Simply buying goods and services from the market with new money.

- Indirect purchase, like:

Hiring state employees and paying some of their salaries with new money. Teachers, doctors, policemen, firemen, elected officials etc.

Paying some of the social welfare with new money. Unemployment, pensions, assistance to people with disabilities etc.

The government may also fund projects that will involve both direct and indirect purchases. Like building new roads. Purchasing building materials for the project will be direct purchase, paying subcontractors for their work will be indirect purchase… of course we can go into debate whether there is a difference between direct or indirect purchase and maybe it's same thing, in a long term maybe it's the same.

But if the government wants to reach immediately a specific firm that may experience a negative time frame, it's better to purchase its products directly, than pay state employees and wait until they decide to purchase these same products with their salaries' money.

So that means that some of the government budget should be covered with new money. Yes, deficit budget is an essential and necessary thing, if calculated accurately. As I already said, injection is not a matter of choice for the government, but it's government's obligation towards the citizens.

So we should always expect the government budget to be slightly bigger than its revenues, and that difference should be covered by new money, but of course that difference should be properly calculated (I=P).

But that begs a question. Due to a significant complexity of the economy, vast amount of data, unpredictable purchasing patterns and irrational behavior, is it really possible for the government to implement the I=P rule effectively? I don't know. Maybe not.

Maybe the government should just make rough estimates and once in a while just inject some amount of new money and that's it. Yes, we may have some inflation, and some firms maybe go unnaturally bankrupt (negative time frames).

But maybe that's just how it is. Maybe there is no real way to analyze all the data and make accurate predictions, so why bother?

What the government should do, is hire some people to work on this problem. Make a good 3d software simulation program that will be easy to work with. So they would insert all the data into this program, and it will produce graphic simulation of different firms and the public, and the exchange of goods and money between them. And this program should be used to monitor and study the I=P problem, and help to develop tools and

methods how to accurately predict and solve new money injection problems and ensure effective circulation.

Because my work is only a simplified presentation of the problem, it's just some basic concepts.

And eventually this software problem should be used to try to simulate real world economy. The data from previous years should be inserted into it, and simulated. And the economists (or whoever will be working on it) will study past events and try to see whether there were incidents of damage and firms going unnaturally bankrupt or products not purchased, due to government inability to make an accurate injection.

And based on that analysis maybe we could make predictions for the future, and the government may learn how to inject new money in more accurate way, and increase the effectiveness of the circulation.

But the thing is that it looks like the governments know about this problem and they do occasionally inject new money into the circulation… but if they know, then why it's not in the textbooks? I don't know what is going on in here…

So to sum up:

- The aggregate prices will always be above aggregate purchasing ability.

- A profit based economy can't be sustained without periodic artificial increase of money in the circulation from outside source, even if this economy doesn't change in size. All the profit in economy equals to injection from outside source.

- Banks do not create new money. They do create a temporary distortion due to loan bubble, but in the long term banks are no different than any other profit producing firm.

- Regular injection of new money by the government is not an anomaly, it's not a bad practice and it's not up to government's will. On the contrary, periodic injection of new money is an economic necessity and government's obligation towards its citizens. Of course it's a very complicated challenge to perform an accurate injection, but nevertheless the government should try its best.

- Budget deficit is not a bad thing, if calculated properly. Some part of the budget has to be consisted of new money, so the spending should always be slightly above income. Covering budget deficit with new money is same as "injection".

That's it. Enough, no? My head hurts because of all the numbers.

Some additional stuff:

*During this work I claimed few times that no profit is possible without injection, and that injection equals profit. It would be more correct to say "no regular monetary profit is sustainable in an economy with fixed amount of money."

So there can be profit to be made, but that's "not normal" profit. Meaning that this "not normal" profit will hurt the circulation. If the public makes profit on salaries (without

loaning out this profit), then firms can't earn back what they spent on labor and have to reduce their production.

Firms can make profit only due to cycles not being synchronized and due to irrational behavior (table D3), but it is also only for short period. Also firms can make profit if other firms are dying and losing money, but that is also "not normal" or sustainable situation.

So as you see technically profit is possible without injection, but it is always for short period of time, and it is usually "not normal" profit that will have to be compensated by injection in the future. The only "normal" profit that can be made without injection that comes to my mind, is profit from a naturally dying firms that lose money to circulation. But that also is not entirely "normal", and of course we don't have enough naturally dying firms in the economy in order to cover for all the monetary profit that is being made.

And of course profit can be made due to loan bubble, but it is also for short period of time. It's only a matter of time before the bubble becomes unstable, and in order to maintain or exit the loan bubble, you have to inject new money.

*I keep thinking about it, and always come back to add more. In the end this article will become a 300 pages book.

As for the equation ("agg prices" — "agg public purchasing ability"), we have to keep in mind the intermediate production stages (like in the table B example). It's not relevant to transactions between firms, but only between firms and public.

*I keep adding stuff…

Here you have a table for "delayed" products:

| pub pur a | firm a | firm b | firm c | firm d | injection | pub t dep | f dep |
|---|---|---|---|---|---|---|---|
| 1891 | 1000 | | | | | 891 | 70 |
| 1891 | 1000 | 1000 | | | | 782 | 140 |
| 1891 | 1000 | | 900 | | | 773 | 133 |
| 1891 | 1000 | 1000 | | | | 664 | 140 |
| 1891 | 1000 | | | 1000 | | 555 | 140 |
| 1891 | 1000 | 1000 | 900 | | 454 | 0 | 203 |
| 1891 | 1000 | | | | | 891 | 70 |
| 1891 | 1000 | 1000 | | | | 782 | 140 |
| 1891 | 1000 | | 900 | | | 773 | 133 |
| 1891 | 1000 | 1000 | | 1000 | 336 | 0 | 210 |
| 1891 | 1000 | | | | | 891 | 70 |
| 1891 | 1000 | 1000 | 900 | | 118 | 0 | 203 |

| pub pur a | firm a | firm b | firm c | firm d | injection | pub t dep | f dep |
|---|---|---|---|---|---|---|---|
| 1891 | 1000 | | | | | 891 | 70 |
| 1891 | 1000 | 1000 | | | | 782 | 140 |
| 1891 | 1000 | | 900 | | | 773 | 133 |
| 1891 | 1000 | 1000 | | | | 664 | 140 |
| 1891 | 1000 | | | 333,3333 | | 1221,67 | 93,33331 |
| 1891 | 1000 | 1000 | 900 | 333,3333 | 120,663 | 0 | 226,3333 |
| 1891 | 1000 | | | 333,3333 | | 557,6667 | 93,33331 |
| 1891 | 1000 | 1000 | | | | 448,6667 | 140 |
| 1891 | 1000 | | 900 | | | 439,6667 | 133 |
| 1891 | 1000 | 1000 | | 333,3333 | 2,666667 | 0 | 163,3333 |
| 1891 | 1000 | | | 333,3333 | | 557,6667 | 93,33331 |
| 1891 | 1000 | 1000 | 900 | 333,3333 | 784,6667 | 0 | 226,3333 |

So the above table is an extended version of D3 table. Let's call the bottom table D4.

So in D4 we turn the firm's D product into "delayed" product. It will still take 5 months to produce it, but it will also take 3 month for the public to purchase it, while each month a third of total amount is being purchased.

So as you see the numbers for injection and firms' monthly deposits are different in both tables, but in the long run they are the same. After 12 months the total amount of injection is same 908 dollars for both tables, and the total amount of firms' deposits is same 1652 dollars. Public total deposits are also 0 for both tables after 12 months.

But notice how dramatically the amount of injection changes in shirt term between the two tables, even though in the long run it evens out.

**\*28.11.2019 I keep adding stuff.**

I have thought about another possibility for "normal" profit without a need for injection, expenditure of profit from the past.

| Firm A | Firm B | Firm C | Firm D | Firm E | Firm F | a.p.p.a | f.a.p.p | inection | | pub t prof |
|--------|--------|--------|--------|--------|--------|---------|---------|----------|--|------------|
| 930 | 930 | 930 | 930 | 930 | 930 | 5239,8 | 6000 | 760,2 | | 340,2 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5239,8 | 6000 | 760,2 | | 680,4 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5239,8 | 6000 | 760,2 | | 1020,6 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5239,8 | 6000 | 760,2 | | 1360,8 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5239,8 | 6000 | 760,2 | | 1701 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5239,8 | 6000 | 760,2 | | 2041,2 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5239,8 | 6000 | 760,2 | | 2381,4 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5239,8 | 6000 | 760,2 | | 2721,6 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5239,8 | 6000 | 760,2 | | 3061,8 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5239,8 | 6000 | 760,2 | | 3402 |
| | | | | | | | | | | |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 0 | | 2982 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 0 | | 2562 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 0 | | 2142 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 0 | | 1722 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 0 | | 1302 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 0 | | 882 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 0 | | 462 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 0 | | 42 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 378 | | 0 |
| 930 | 930 | 930 | 930 | 930 | 930 | 5580 | 6000 | 420 | | 0 |

Let's go back to table A. Now let's also add that workers make 7% profit on their salaries and put it away. The owners still make 120 dollars a month and spend it all. 7% of 90 dollars of workers' salary is 6,3 dollars, multiply by 54 is 340,2 dollars of total workers' profit. Also the public purchasing ability decreases by same amount, to 5239,8 dollars. Therefore the injection amount increases to 760,2 dollars each month (Firms still make 7% profit from sales).

After 10 months the workers have accumulated in total 3402 dollars. Now let's say for some reason their purchasing pattern changes, and they will try to purchase all the available products each month, including by spending money that was saved from previous months.

So now the workers no longer make profit and the a.p.p.a. is back to 5580 dollars. But also the workers will withdraw from their previous profits, so the public will be able to purchase all the 6000 dollars' worth of products available each month. And as you see in the table, after 18 months the public runs out of savings (accumulated profit) and the government has to renew money injection.

Does it mean I=P no longer work? Well if you look after 20 months, the workers have 0 profit. The firms have 8400 dollars profit. And the total amount of injection is also 8400 dollars. So it works.

Of course applying I=P rule to 20 month time frame is not very effective. We should choose a one month time frame, and monitor the behavior of the participants. If at first the public saves money (makes profit), then we should compensate with increased amount of new money injection.

If after 10 months we see public increase spending, even including spending accumulated profit, then we should reduce the injection accordingly.

Notice how overall we had more profit then injection though. We had 3402 dollars of public profit, and 8400 dollars profit, making it total of 11802 dollars of profit.

But the public profit was later converted into expenditure. Basically public's profit was relocated to firms' profit.

Theoretically it's possible after X period of time to have 0 amount of accumulated profit. But it doesn't mean that there was no profit created during this X period, that required injection of new money, only later this profit was converted into expenditure.