
Edwin Cannan, ***The Application of the Theoretical Apparatus of Supply and Demand to Units of Currency*** [1921]

THE APPLICATION OF THE THEORETICAL APPARATUS OF SUPPLY AND DEMAND TO UNITS OF CURRENCY[1]

I HAVE used what will perhaps appear a somewhat clumsy phrase in place of the more familiar "Laws of Supply and Demand," or even the "theory of the relation of demand and supply to value," because I think it desirable to suggest that "Supply and Demand" are heads of arrangement rather than the name of a doctrine. When we say that the value of a thing depends on supply and demand, we do not, or at any rate ought not, to mean more than that we think it will be convenient to arrange the causes of changes in value under those two heads.

The stock of some things (such as milk, or even wheat) in hand at any one moment is so small in proportion to the annual produce, that we think of the stream of produce as furnishing the supply, and the ability and willingness of people to consume the thing as furnishing the demand. Of other things, such as land and railways, the annual production is so small compared with the stock, that we think of the stock as furnishing the supply, and the ability and willingness of people to use the thing as furnishing the demand.

Currency belongs to the second class. It is one of those durable instrumental goods of which the stock at any moment is very large in proportion to the annual gross additions to and gross subtractions from the stock.

We may consequently think of the supply, as we think of the supply of houses, as being the stock rather than the annual produce; and we may think of this supply, as we think of the supply of houses, as being increased by net additions to the stock, and decreased by net subtractions from it.

Following the same line with demand, we must think of the demand for currency as being furnished, not by the number or amount of *transactions*, but by the ability and willingness of persons to *hold* currency, in the same way as we think of the demand for houses as coming not from the persons who buy and

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“The Application Of The Theoretical Apparatus Of Supply And Demand To Units Of Currency” ***Economic Journal,*** Vol. 31, 1921, Pp. 453–461.1

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Following the same line with demand, we must think of the demand for currency as being furnished, not by the number or amount of *transactions,* but by the ability and willingness of persons to *hold* currency, in the same way as we think of the demand for houses as coming not from the persons who buy and re-sell or lease and sub-lease houses, but from the persons who *occupy* houses. Mere activity in the house market—mere buying and selling of houses—may in a sense be said to involve “increase of demand” for houses, but in the corresponding sense it may be said to involve an equal “increase of supply”; the two things cancel. The demand which is important for our purposes is the demand for occupation. In the same way, more transactions for money—more purchases and sales of commodities and services—may in a sense be said to involve increase of demand for money, but in the corresponding sense it may be said to involve an equal increase of supply of money; the two things cancel. The demand which is important for our purpose is the demand for currency, not to pay away again immediately, but to *hold.* Just as you are a less important demander of houses if you occupy a £1000 house than if you occupy a

£2000 house, so you are a less important demander of currency if you keep on the average £5 in your pocket than if you keep £10.

It may be said that, in addition to the demand of persons and institutions for currency to *hold,* there is also sometimes a demand by banks and governments for currency to *destroy,* as, for example, at present in this country, when the Treasury is buying in Currency Notes and burning them. But as this demand always, or almost always, comes from institutions which have issued quantities of paper and subsequently repented, it is usually regarded as simply reducing the supply instead of increasing the demand. In favour of regarding the institution as a demander, it may of course be said that the fact that it acquires the currency to burn rather than to hold is immaterial, since it makes no difference whether the currency acquired is held or burnt, provided it is not reissued. It is, some one may say, all the same whether Currency Notes which have been withdrawn have been burnt or are stored somewhere in the Bank of England. But this is not quite true, since, if the notes were still held, they would appear in the total stock which we have agreed to call the supply, whereas, having actually been destroyed, they no longer appear in the total. Consequently it is more convenient to follow ordinary usage in this matter, and speak of banks and governments which buy up and burn currency as reducing the supply.

To clear up our ideas about the demand for currency, let us think of a few obvious causes of increase and decrease of demand for it.

The most obvious cause of increase of demand for a currency is an increase in the number of persons who use it. At a very early age—often at his or her christening—each new member of the human race begins to hold a small quantity of currency, and the child of six sometimes has more than his father or mother. There are plenty of examples of increase of demand from this source having been sufficient to cause a noticeable increase in the value of a currency which is limited in amount—the Indian rupee after the closing of the Indian mint and the American greenback are often quoted, and the general increase of gold and silver-using populations, though it has not actually raised the value of gold and silver currencies, has at any rate obviously prevented them from falling as fast as they would otherwise have done. The great rise of prices after the Black Death may be given as an example of the converse effect of diminution of population in diminishing the demand for, and consequently the value of a currency.

The introduction of anything which economises currency, *i.e.* which makes it unnecessary for people to keep so much currency by them on the average, tends to diminish the demand for currency. To take the simplest possible example, suppose a landlord living on his rents paid quarterly, and that neither he nor his farmers have bank accounts. The farmers will have to accumulate a considerable sum in currency towards quarter-day, and this will then be handed over to the landlord, who will only *de*cumulate it gradually as the next quarter wears on. Between them they will always have a large sum of currency, the landlord holding most of it at the beginning of the quarter and the farmers the most of it at the end. But if a bank is started, and they all open accounts at it, the farmers will no longer accumulate currency to pay rents with, but will accumulate balances at the bank, and when quarter day comes will order the bank (by their cheques) to pay the landlord, who will be content to see their balances transferred to him, and will not want the store of cash which he formerly required. The bank, of course, will provide a new demand for currency, since it will require a full enough till, but enough for it will be very much less than the amount formerly required by the farmers and landlord.

That banks economise currency in this way is obvious, but there is no possible means of discovering or estimating *how much* they economise it. We may know that we keep an average of £10 a head in currency now, when we have banks, but we cannot possibly form the wildest guess how much we should keep if there were no banks. Some of us would probably never have been born: the whole situation of the world would be different. No doubt some other ingenious methods of economising currency would have been devised if some ban had been placed on banking.

A change in the distribution of wealth may cause a change in the demand for currency. If the rich and banking portion of the people becomes richer, it does not keep appreciably more currency in its pockets, but increases its balance at the bank. But if the poorer non-banking portion becomes richer, it does accumulate currency, not only in its pockets, but also in money-boxes and mugs on the chimney-piece and other strange places.

Innumerable are the changes of social circumstances which may lead to greater or less economy of currency, and consequently less or greater demand for currency. The calling up of men for military service, and subsequently the large removal of women from their homes for munition-making and other purposes during the recent war, greatly increased for the time the demand for currency, because the members of families, when separated, found it convenient to keep much more currency by them in the aggregate than when they were living at home and together.

Like the demand for other things, the demand for currency is liable to be varied by the miscalculations of mankind about the future. If we were all level-headed prophets, fluctuations of prices would be smoothed out. There would still be slowly rising and falling tides, but waves would disappear. But in fact we all foresee wrong, and our individual mistakes do not balance each other—we foresee wrong to some extent in unison. One year we agree in over-estimating the potato crop, and the next year in under-estimating it: when we over-estimate it, our willingness to buy early is less than if we foresaw correctly, and for the time demand is kept below what it would be if prices were kept as stable as possible. The same thing happens with currency, though it is not nearly so obvious. If there is a predominating impression that prices in general are going to rise, there will be a predominating tendency to hold commodities for the rise, which will itself raise prices at once. Every one can see this, but few notice that this tendency to hold goods back, resulting in a rise of prices, is the same thing as a diminution in the demand for currency. Currency becomes the depreciating article which people in general are less willing to hold. Vice versa, if it is generally expected that prices will fall, most people are more eager to get rid of goods and are more willing to hold currency.

You must not expect to find evidence of increased or decreased willingness to hold currency in actually increased or decreased stocks of currency. If the total is a fixed amount it cannot vary in that way. The evidence is to be looked for in the fact that more or less goods are actually being given for the unit of currency. You can have an increased and a decreased demand for houses without finding any alteration in the number or size of houses.

The effect of misguided speculation for the rise or fall of the value of a currency is disguised, so far as internal speculation is concerned, by taking the form, in each individual case, of speculation for the fall or rise of particular commodities. Very few persons grasp the idea of a rise and fall in the value of their own country's money, and the Money Market is a place where you deal in loans, not in money. We have not yet risen to the height of having a Currency Market in which you can buy and sell future Board of Trade, Statist and other Index Numbers. But direct speculation in the currency of other countries is common enough, and is often ill-informed enough to cause great disturbances of values, instead of smoothing them down. Some time ago, the editor of an Athens newspaper was unable to go to a certain restaurant there because the waiters worried him with questions about the future of Austrian crowns which they were holding. When the British troops first went to Cologne, they bought German marks because they saw that the mark was "lower than usual." It is known that many milliards of the depreciated currencies are held by foreigners. Such holding is, of course, a pure addition to the usual demand for currency, and tends to maintain its value for a time. Eventually, however, the foreign holders decide to sell, and their decision is much more likely to come at a time when it will make a fall more precipitous than when it will moderate a rise. This ignorant speculation of foreigners has been the cause of many violent fluctuations of currency values and is a great support of the doctrine that they "depend on confidence." About that we need not say more than that the price of sugar also is affected at any moment by people's views of what it will be in the future, but we do not say that "the price of sugar depends on confidence."

The supply being taken as fixed, *how much* will a given increase of demand send up the value of currency? One difficulty in answering the question arises from the fact that we have no easy means of measuring increase of demand, and consequently scarcely know how to exemplify a "given increase of demand." But one example seems workable. Suppose that to a country with a particular currency of its own there is added a new province one-tenth as large and with exactly similar characteristics, which has just, by some accident, lost all its own currency, and that the annexing country creates no additional currency, but allows the new province to supply itself as best it can. We may look on this as providing, after some initial disturbance, 10 per cent. of additional demand. The people in the new province, wanting a medium of exchange, would have to give people in the rest of the country commodities and services to induce them to part with some of their holdings of currency; these sales would send down the prices of commodities and services, and correspondingly elevate the value of currency. How much in the end, when things had settled down, would depend on what we have learnt from Marshall to call "the elasticity of the demand" for currency. This has often been supposed to be what he calls "unity," which would mean that an increase of demand would cause an exactly proportional rise in the value of currency and a reciprocal fall of prices. So that, for example, in the case given above, when the new province was provided with its one-eleventh of the whole currency, prices would be down one-eleventh and the value of the unit of currency up one-tenth. We can see why if we reflect that when prices fall from eleven to ten, and £10 consequently buys as much as £11 did before, we will find it convenient to carry only £10 about with us instead of the £11 we did before. So, to induce the old country to part with one-eleventh of its stock, a reduction of prices by one-eleventh will be required and be sufficient. But we shall do well not to accept this doctrine that the elasticity of the demand for currency is always unity, till we have considered it in relation to supply. We shall then see reason to doubt it.

Now let us turn to the Supply side of the question, asking ourselves about the effect of alterations in supply of currency.

Given a certain demand, increase of supply, in case of any article, reduces value, and currency is no exception. The additional supply of currency is usually given by the producer, or issuer, in exchange for commodities and services, and his coming in as a new and additional buyer of such commodities and services raises the price of those things and diminishes the value of what he is offering—that is, currency. Sometimes, indeed, he gives the new currency away in doles and pensions without getting any return (except ingratitude), but this is not essentially different, since then the recipients of his gifts are the new and additional buyers.

Great confusion is often introduced at this point by neglect of the distinction pointed out by Sidgwick between increase of demand and what he calls “extension of demand.” We often say that the demand for a thing has increased when we only mean that people are taking more of it because they can get it cheaper. It is obvious, however, that it is not this kind of increase of demand that we have in mind when we discuss the effect of increase of demand upon values. We could not say in the same breath that increase of demand for houses raises the value of houses, and that a fall in the value of houses causes an increase of demand for them. We can say in the same breath, that increase of demand raises the value of houses, and that the fall of value *extends* the demand for them (or, vice versa, a rise of value *contracts* the demand). No more in the case of currency than in any other case does the increase of supply defeat itself by causing *increase* of demand. It only *extends* demand, inducing people to hold more currency because the fall of value makes it possible to hold larger amounts with equal sacrifice and necessary to hold larger amounts to secure equal convenience. People will take the additional currency as they take additional whisky when it is watered and offered to them at a lower rate, but that does not show that, in the absence of increase of demand in the narrower sense, they will take additional whisky or additional currency at the old rate.

The next question is *how much* a given addition to the supply of currency will raise prices and lower the value of the unit of currency? This is really the same question that we have already asked in regard to the effect of a given increase of demand. The answer is the same—it depends on the elasticity of demand, and there is the same *primaˇ facie* reason for believing that the elasticity at bottom is unity, so that, always in the absence of any increase or decrease of demand in the narrow sense, an increase in the supply should cause an exactly reciprocal diminution in the value of the currency. But great doubt is thrown on the doctrine when we reflect that if it were universally true, issuers of legal tender could go on buying goods and services with new issues indefinitely. The process of doubling the currency in, say, the first month, would indeed gradually bring the purchasing power of the unit down to one-half, but as the issuer at the beginning would be buying very near old prices, and only at the end at the new prices, he would have acquired goods and services worth over three-quarters of the value of the total of the old currency. By another issue equal to the old currency he would only get half as much, but there is nothing to prevent him issuing twice as much in the second month, four times as much in the third, eight times in the fourth, and so on, and then he will be able to go on acquiring the same amount of commodities per month indefinitely. Experience seems to show that the unit of a currency falls to zero in value long before the supply of the currency reaches infinity, and believers in the doctrine have been unable to explain why. They have contented themselves with eluding the point by means of propositions, such as “however many kronen the Austrian Government issues, so long as they really circulate, they will always have some value, however small.”[2] No doubt; but is it not equally true that so long as they have some value they will continue to circulate? They will stop circulating when they lose all value. The explanation seems to lie in the fact that human intelligence anticipates what is coming. When it is seen that the value of currency is steadily falling, people see that it is more profitable to hold goods than currency, the demand for currency fails to extend in proportion to the enlargement of the supply, and its value consequently falls more rapidly. The issuer very likely redoubles his efforts to keep up with the fall by issuing new currency at a still more rapidly increasing rate, but all to no purpose—he is bound to lose the race, and the reason is that the elasticity of demand is less than unity.

In the converse case, that of reduction in the supply of currency, there is also reason to expect an elasticity less than unity. As general prices fall owing to the reduction, people will endeavour to protect themselves by displaying greater readiness to part with goods and services, and less to part with currency, and anticipation will thus cause the fall of general prices to outrun the diminution of currency. Pushed to the extreme limit, the policy would put a stop to the circulation of the currency, as it would all be hoarded, and exchanges of goods would be made by barter. But things are never pushed so far, because, long before, substitutes for the existing currency are always introduced and check the rise of purchasing power. For example, as soon as a reduction of our present paper currency went so far as to make £1 of it worth more than 113 grains of fine gold, substitutes for it would begin to come into use in the shape of sovereigns and half-sovereigns.

Lovers of paradox might say that a currency may go out of use either because it is too cheap, or because it is too dear, but that is not the true conclusion of my argument. The true conclusion is that a continuance of rapid change in either direction will cause a currency to go out of use. This is perfectly reasonable, stability of value being one of the most important requisites of useful currency, and Gresham's law that bad money drives out good being fortunately quite untrue of the long run.

Notes

[1.] Read before Section F of the British Association, Edinburgh, 1921.

[2.] I quote from Miss Van Dorp's review of Dr. G. M. V. Stuart's Inleiding tot de Leer van de Waardevastheid van het Geld, in *Economic Journal,* June 1921, but I am not sure whether the opinion is that of the author or the reviewer, or both.