

Cantillon, Quesnay, and the *Tableau
Economique*

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Abstract

Schumpeter argued, long ago, that Quesnay's *tableau économique* was based on Cantillon, but this claim has never been spelled out in detail and seems not to have been generally accepted, since many writers still write of the *tableau économique* as though it were Quesnay's alone. This paper examines the relation between Cantillon and Quesnay in more detail than before and argues (a) that the relation between Cantillon's analysis of circulation and Quesnay's *tableau* is too close to be a coincidence, but (b) that the use Quesnay put it to is quite different from its role in Cantillon's system.

Keywords: Cantillon, Quesnay, Tableau Économique

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Introduction

Joseph Schumpeter argued long ago that ‘Cantillon was the first to draw a *tableau économique*. And, barring differences that hardly effect essentials, this *tableau* is the same as Quesnay’s’ (1954 222). This claim has been repeated, for example by Foley (1973 139–40) and Brewer (1992 163–4). Meek discussed the relation between Cantillon and Quesnay, but simply referred in passing to ‘the well known parallels between Cantillon’s account of the circulation process and Quesnay’s’ (1963 265). All the authors cited presented the argument very sketchily, assuming that the underlying similarities between Cantillon and Quesnay would be obvious to any reader who had been alerted to them. That seems to have been a misjudgement. Aspromourgos (1993 171–2), for example, describes the claim (among others) as a ‘gross absurdity’. Pressman, in a book-length study devoted entirely to the *tableau* (1994 182) said that Quesnay ‘developed a model at a time when there were no other models in existence to serve as his guide’. Many writers (too many to cite) write of the *tableau économique* as though it were Quesnay’s alone.

The purpose of this paper is to examine the antecedents of the *tableau économique* in more detail than has been usual. I will present a formal tableau² based on Cantillon’s text to demonstrate how closely Quesnay modelled himself on it, but I will also argue that Quesnay’s economics was different from Cantillon’s in other ways, primarily because Quesnay stressed the need for investment in agriculture and thought that the French economy was performing well below its potential. Quesnay almost certainly took the basic idea of the *tableau* from Cantillon, but he set it in a very different context.

Quesnay’s *tableau*.

Since it is the origins of Quesnay’s *tableau* that are under discussion, it is convenient to start by setting it out briefly. Quesnay presented many *tableaux*, differing in the numbers used and in the way they are presented. The famous zigzags of the earliest versions were later abandoned. They were no more than an expository device, since they clearly do not represent a real process that goes on during the notional ‘year’ involved. As Quesnay well knew, farmers sell their crops to merchants after the harvest, so any zigzagging is between merchants and buyers, not between farmers and the rest of the economy. I will take one of the simplest and best known versions of the *tableau*, that of the ‘*analyse*’ (INED 1958 801; also Meek 1962 159) as my example (Figure 1).³

² The numerical example presented here is in Brewer (2001), but with minimal discussion. Benites-Rochel and Robles-Teigeiro (2003) also present a tableau derived from Cantillon, but not in a form which makes the connection with Quesnay visible; their main concern is to relate both Cantillon and Quesnay to Boisguilbert. See also Benites-Rochel and Robles-Teigeiro (1984).

³ The ‘*précis*’ form used in *Philosophie Rurale* is very similar. See also Steiner (1992 242) for a flow diagram representing the *tableau* which would serve equally well to make the link with Cantillon. Steiner plays down the Cantillon/Quesnay link (246).

[insert Figure 1 near here]

How should this *tableau* be read? The figures represent sums of money (in *milliards* of *livres*, but the units do not matter). The sloping lines represent flows of money (not goods) between the three sectors. Flows are ‘downhill’, that is, the money flows from the higher end of the sloping line to the lower end (and goods or services pass in the opposite direction). The ‘productive class’ are the farmers, the ‘sterile class’ are artisans and the like (the manufacturing sector), while the ‘proprietors’ (who can be taken to include the state and the church) produce nothing but receive rent from the farmers. Real production does not appear anywhere in the *tableau*, though it is implicit in the fact that farmers and artisans have something to sell.

At the start of a notional ‘year’ (top row of the table), the farmers have two *milliards*, the proprietors have another two which they have just received from the farmers, and the artisans have one. The proprietors spend their revenue, half on agricultural products and half on manufactures. This accounts for the two lines stretching south-east and south-west from the figure 2 under the proprietors’ column. They will receive another two *milliards* at the end of the year to put them back where they started. The artisans spend their initial one *milliard*, plus the *milliard* they receive from the proprietors, on agricultural products, but they receive a *milliard* from the farmers, restoring their position. Artisans’ spending matches receipts. The farmers spend a *milliard* on manufactures but receive three *milliards* from purchasers of agricultural produce (two from the artisans and one from the proprietors), while farmers as a whole retain a *milliard* of the two *milliards* they started with, passed from hand to hand in transactions within the sector. They therefore end up with four *milliards* (one carried forward plus three received), out of which they can pay two to the proprietors and be left with two, as at the start. Circulation between the sectors has restored the starting position. All of this is set out very clearly in Quesnay’s *Analyse de la formule arithmétique du tableau économique* (INED 1958 795–7, 799–801). The total of five, and the final two in the column for the productive class do not correspond to actual money payments. The idea is that agriculture keeps two *milliards* worth of its own produce, so the total gross output of agriculture is five *milliards* (INED 1958 798).

The *tableau* shows flows of money spending between sectors. That is all. It does not encapsulate the whole of physiocratic economics. The claim that Cantillon anticipated the essential elements of the *tableau* does not mean that Cantillon anticipated all other aspects of Quesnay’s economics – that would indeed be ‘a gross absurdity’. Quesnay frequently used the *tableau* as a peg on which to hang a textual exposition of other arguments, but these must not be confused with the *tableau* itself.

Cantillon’s ‘*tableau*’

Cantillon did not set out a *tableau* in the literal sense, that is, a tabulation of transactions. It is therefore necessary to read his text and to translate it into a form similar to Quesnay’s. The relevant section of Cantillon’s *Essai* (1755, part 2, chs 3–4, in conjunction with part 1, ch. 12) is on the circulation of money between city and

country and on the amount of money required for the task, that is, on the determinants of the velocity of circulation.

Cantillon divided the economy into rural and urban sectors rather than into agriculture and industry, because he thought that money played a different role in the city and the country. In the country little money was used since most transactions were carried out by barter at valuation, that is, by exchanges based on money prices but without the use of any actual money.⁴ In the rural sector, the use of money was confined to transactions with the urban sector and the payment of rent to proprietors. Farmers sold part of the harvest to city merchants in return for money, and paid rents and bought urban goods with the proceeds. In the city, by contrast, cash was used mainly for small transactions, since financial instruments of various kinds might substitute for larger amounts of cash. Cantillon treated rural production of manufactures for purely local consumption as part of the rural sector because his concern was with the circulation of money, and rural manufactures conformed to the rural pattern. He also assumed that landlords live in the city, and therefore included them in the urban sector. Farmers sell to city merchants, and landlords (or their servants) buy from city traders. Rent payments appear as a payment by the rural to the urban sector. It is, however, trivially easy to treat landlords as a third sector and to redraw sectoral boundaries to correspond to Quesnay's. In what follows, I will keep Cantillon's urban-rural split but separate out landlords as a separate sector.

Cantillon assumed that the farmer has 'three rents', that is, that he pays one third of the value of his produce to the landlord as money rent, one third covers his costs, and the third he keeps. These three rents are 'the mainspring of circulation in the state' (123). Farmers spend part of the remaining two thirds on 'iron, tin, copper, salt, sugar, cloth, and generally all the merchandise of the city' (123), for which they need cash. Cantillon settled on a sixth of the value of output for this part of spending, that is, a quarter of what remains after rent is paid. Farmers must therefore sell half of their produce (a third plus a sixth) to cover rent payments and non-agricultural purchases. Transactions within the agricultural sector are assumed to be carried out without using cash. The corresponding fraction in Quesnay's *tableau* above is three fifths, made up of two fifths rent and one fifth farmers' spending on manufactures.

Cantillon's example can be set out as a *tableau* (Figure 2). He took the total value of farm output (the sum of the three rents) to be 15,000 ounces of silver (127). Taking a thousand ounces of silver as the unit, farm output is 15, rent is 5, and rural spending on urban products is 2.5. The landlords spend all their rent income in the city, but the urban sector then spends it. If the landlords buy agricultural products, of course, they are just buying what merchants have already bought from farmers. If they buy manufactures, the artisans either spend the money on food or pass it on to other urban producers, who spend some on food, and so on. In the end, the money must all return to the country.

[Insert Figure 2 near here]

⁴ Quesnay, similarly, argued that half of agricultural output is 'consumed in kind' and is 'not marketable', though wages, it seems, are paid in money (INED 1958 861).

We are told that the total stock of money is 10. The initial distribution is not specified, because it is not important. I have distributed it arbitrarily in such a way as to keep the *tableau* as simple as possible: 2.5 each to the columns representing farmers and urban residents other than landlords, and 5, equal to rents received, to the landlords. The artisans and merchants ('other urban') start with 2.5 and receive 5 from landlords' spending and 2.5 from farmers' spending. They spend all they receive on rural products, ending up with the 2.5 they started with. Farmers spend 2.5 and receive 7.5, so they end up with an extra 5 which they pay as rent to landlords. Half of their output, 7.5, is consumed in the country, and does not register in the list of intersectoral transactions.

Every step in this *tableau* is based squarely on Cantillon's text. Comparison of the two *tableaux* shows how closely Quesnay's *tableau* matches Cantillon's verbal account. The only significant difference is that Quesnay shows half of landlords' spending going to agriculture while Cantillon assumed that landlords buy agricultural products via merchants who he counted as part of the urban sector. This is a difference of presentation, not substance.

A more general notion of the circulation of spending goes back well before Cantillon: certainly to Law (1705: see Murphy 1993) and Boisguilbert (Benitez-Rochel and Robles-Teigeiro 2003), and indeed earlier. Cantillon's verbal formulation was, however, almost identical in structure to Quesnay's arithmetic *tableau*, which earlier writings were not.

The role of circulation in Cantillon's system

Cantillon's numerical analysis of the circulation of money, used as the basis for the *tableau* presented above, is in part 2 of his *Essai*, on money. It is firmly based on the analysis of the pattern of land use, employment and consumption, in short, of the allocation of resources in a closed economy, developed in part 1.⁵

Cantillon's exposition in part 1 turns on an example of a hypothetical self-sufficient landed estate with a single owner, which he used twice, first to show how labour costs could be reduced to the amount of land required to support a worker, and hence to reduce what he called 'intrinsic values' (equilibrium prices) from land-plus-labour to land values alone (Cantillon, 1755, ch 11; see also Brewer, 1988a), and second to support his claim that landowners' choices ('fancies, fashions and modes of living') determine the pattern of output and employment (ch 14).

In a self-sufficient estate with a single owner, the owner can use the land as he pleases, remembering always that any people he employs to meet his wishes, say craftsmen to produce manufactured artefacts or servants to look after his personal needs, have to be fed and otherwise provided for, so land (and labour) must be allocated accordingly. If the owner, for example, wants to ride, then fodder must be

⁵ For a fuller discussion see Brewer (1992).

grown for the horses, while if he wants music, the musicians must be provided for, and so on.⁶

Cantillon then introduced the market. Rather than directing every detail himself, the owner could rent the land to farmers and buy agricultural products and manufactured goods from the producers. If consumption patterns remained the same, then nothing would change except that the owner would be saved the trouble of management while the farmers, master craftsmen, and the like would 'have more care and satisfaction working on their own account' (Cantillon 1755 61). A market system with many estates and landowners is not in essentials different: the allocation of land between different uses, and hence the pattern of production and employment, is determined by total demand from landowners as a whole just as it would be if there were only a single landowner. The landowners can live in the city and need have no direct contact with their estates.

There is a critical assumption built in to this account (and into all of Cantillon's economics) that the productivity of the land in any particular use is given. For example, he discussed an example in which the landowner 'decreases the number of his domestic servants and increases the number of his horses' (1755 63). There is less demand for corn and more for hay, so land is reallocated accordingly. Land is switched between different uses according to landlords demand, but there is a clear implicit assumption that there are well defined opportunity costs of one product in terms of another, so that producing more hay means producing less of something else. Cantillon did not treat land as homogeneous and he recognised that different countries have different ways of life as well as different qualities of land. He devoted some space to calculations of the land required to support a person in different places. But all of this is treated as given and essentially unchanging. If, for example, a village continues 'in the same situation as regards employment, and derives its living from cultivating the same portion of land, it will not increase in population in a thousand years' (23).

This is fundamentally different from Quesnay, whose main aim was to raise the productivity of French agriculture, which he thought was working well below its potential. In modern terms, one could say that in Cantillon the system is assumed to be at a point (determined by the pattern of demand) on its production possibility frontier, while Quesnay thought that the system was at a point well within the production possibility frontier. (Quesnay's view will be discussed in more detail below.)

Cantillon first discussed circulation between the city and the country in a chapter showing that 'all classes and individuals in a state subsist or are enriched at the expense of the proprietors of land' (1755 43). Agricultural villages (which, recall, do not change in a thousand years) are the basis. The city is, in a sense, secondary, in that it specializes in activities which could be carried out in the country (on landed estates, for example) but which are concentrated in urban locations for good reasons. Landowners commonly choose to live in cities and spend their rents there, and

⁶ The Esterhazy family, a little later in the eighteenth century, had a full orchestra complete with conductor/composer (one Joseph Haydn!) on their estate in Eisenstadt, Austria.

farmers spend part of their income on manufactured goods produced in the city. It was reckoned that half the population lives in the city, and this can be accounted for if 'the farmer who has two thirds or four sixths of the produce of the land, pays either directly or indirectly one sixth to the citizens in exchange for the merchandise which he takes from them. This sixth with the one third or two sixths which the proprietor spends in the city makes three sixths or one half of the produce of the land' (45).

The more detailed account of circulation which is the basis for the '*tableau*' constructed above comes in part two of the book, where the focus is on money, and where Cantillon's aim is to determine the amount of money needed to carry out the circulation between city and country, and hence the velocity of circulation, as explained above.

What is important is that Cantillon, by contrast with Quesnay, depicted the circulation of money between sectors as simply the implementation of a pattern of allocation and distribution determined by real factors, by the quantity and productivity of the land and the consumption choices of individuals, primarily of the prince and the landowners.

Quesnay's first economic writings

Quesnay's first publication on economic issues, the entry *Fermiers* for the *Encyclopedie*, appeared in January 1756 (INED, 1958 427-58). Cantillon's *Essai* had appeared a few months before, in 1755.⁷ Quesnay's *Encyclopedie* articles are important as a record of the development of his thinking, both for what they contain and for what they do not.

There is no sign of any influence or even any awareness of Cantillon's ideas in the article on *Fermiers*. There is nothing on circulation which could be seen as foreshadowing the *tableau* and no clear or formal statement of the claim that only agriculture produces a surplus. The only discussion of intersectoral relations is a rather bad-tempered attack on the 'disorders of luxury' which divert resources away from agriculture and weaken the state. The export of agricultural goods is, Quesnay claimed, to be preferred to other forms of commerce, because it is more secure and because commerce itself is a zero-sum game, so that the gain from agricultural exports is the stimulus it gives to agricultural production rather than any gain from trade itself. The zero-sum view of trade is attributed to Locke. Agriculture should be encouraged because its products are readily visible and it can thus be taxed more effectively than other sectors (454-5). But these rather weak arguments are tangential to the main thrust of the piece.

⁷⁷ Grimm *et al* (1878 43) has a note dated 1st July 1755 recording Cantillon's *Essai* as a new publication, available one month before, hence around 1st June 1755. Mirabeau had, it seems, had a manuscript copy of Cantillon's work in his possession for some time, but he only discussed it with Quesnay in 1757, after it was published (Meek, 1963 15).

The main thesis of *Fermiers* is that French agriculture had declined and was performing well below its potential. Quesnay described *la grande culture*, conducted by rich farmers (*fermiers*) who are able to invest in the best methods of production, renting land from the landowner and using horses. This up-to-date, British-style agriculture produced a large output and a large surplus. In most of France, however, the cultivators were poor and unable to afford this style of agriculture. Instead they were share-croppers (*métayers*) who relied on the landowner to provide a limited amount of investment and used the landowners' oxen in place of horses. They produced only a meagre surplus. Freedom of trade in grain and reduced and, above all, predictable taxation, together with other reforms could restore profitability in agriculture and allow the spread of more productive methods of farming.

This diagnosis of the problems of agriculture remained a central, arguably *the* central, theme in Quesnay's economics for the rest of his life. It contrasts sharply with Cantillon's complacent assumption that agricultural productivity (manifested, for example, in the amount of land needed to produce a certain output, and hence the 'intrinsic value' of the product concerned) can be treated as given. Quesnay was himself the son of a small-scale rural entrepreneur and had started his practice as a doctor in a small town. The encyclopedia articles show his detailed knowledge of agricultural conditions. It is reasonable to suppose that this part of his thinking had developed long before Cantillon's book was published.

Quesnay's second economic publication, the Encyclopedia article *Grains*, followed in November 1757, when he had clearly had time to read and absorb Cantillon. He described the relation between agriculture and other sectors in terms which seem to prefigure the *tableau* of a few months later, and quoted directly from Cantillon (without naming him) in exactly that context. He argued that the incomes generated in agriculture ('the revenues of the king, the clergy and the landowners and the earnings of farmers and those they employ') are spent and thus distributed to 'all other estates and professions'. 'An author [Cantillon] acknowledged these fundamental truths when he said "that the assemblage of several rich landowners living together in the same place suffices to form what is called a city ... in which case the size of a city is naturally proportioned to the number of landlords who live there, or rather to the produce of the land which belongs to them"' (INED 1958 482-3, citing Cantillon 1755 17).

Meek (1963 267-8) has emphasized another possible sign of Cantillon's influence in Quesnay's *Grains*. As Meek saw it, in the fully formulated physiocratic theory only landowners get a truly disposable or 'net' income, whereas in Cantillon's analysis farmers get a net income, over and above their costs, equal to about a third of their total output and thus share in the surplus or net product alongside the landowner. In *Grains*, but hardly anywhere else, according to Meek, Quesnay seems to have endorsed Cantillon's view.⁸ There are difficulties with this argument. Some scholars (for example Vaggi 1987) would argue that farmers receive a (permanent) net income even in later physiocratic writings. This is not an appropriate place to enter into that debate. At the same time, I would argue that the logic of Cantillon's system would make farmers' (average) incomes no more than a return for their work, like wages in

⁸ See Meek's article for specific citations from *Grains* to support his argument.

other occupations. The 'three rents' which Cantillon used repeatedly are, one could argue, no more than a rule of thumb. It is not really very important in Cantillon's system whether there is an element of 'net' income in the farmers' return since, unlike Quesnay, he saw no place for continuing net investment in agriculture. Meek's claim therefore threatens to open up quite large and difficult issues in the interpretation of both Quesnay and Cantillon. What is relevant here, though, is that Quesnay's tone in *Grains* seems much closer to Cantillon than in some of his later works.⁹

Quesnay took another step towards the developed physiocratic system in the articles *Hommes* and *Impôts* of 1757 (written for the *Encyclopedie* but not published because the *Encyclopedie* was suppressed).¹⁰ The earlier articles had argued that agriculture had declined in France, and Quesnay followed up in *Hommes* by arguing that population had declined drastically, from 24 million to only 16 million. This much is quite different from Cantillon, but other elements in the argument are strongly reminiscent of Cantillon. The exclusive productivity of agriculture was clearly stated here for the first time: 'it is only those who cause to be generated from landed property products whose value exceeds their costs who produce wealth, or annual revenue'.¹¹ This key element of physiocratic theory is immediately restated in a slightly different form: 'all classes of citizens ... draw their revenue or their gains from the products of landed property' (Meek 1963 96; INED 1958 548). Cantillon had written: 'all classes and individuals in a state subsist or are enriched at the expense of the proprietors of land' (Cantillon 1755, heading to book 1 ch. 12).

Of particular note is a passage which Meek rightly described as 'the germ of the tableau économique' (Meek 1963 93n). The context is a discussion of exports of agricultural products in which Quesnay wanted to refute the mercantilist view that 'nations ... grab money from one another'. The simple closed-economy circulation between agriculture, manufacture and landowners is therefore expanded to allow for merchants who 'turn their money to account by purchasing commodities which they export and commodities which they import' (Meek 1962 92).

The cultivator and the manufacturer, who sell to the merchant, similarly turn to account the money which they receive from the merchant by regenerating exchangeable products. The proprietor uses the money he receives from his farmer to purchase the foreign commodities which the merchant has imported; and the merchant returns this money to the farmer who sells him the products yielded by his cultivation. The workers [in each sector] buy produce and commodities ... and the money is turned back into the cultivation of the land and the production of the manufactured goods which are reproduced.' (Meek 1962 92-3)

⁹ Also worth noting is a remark in the article *Impôts* of 1757 that the farmer's costs typically amount to two-thirds of the harvest, a possible echo of Cantillon's three rents (INED 1958 581, Meek 1962 103).

¹⁰ Though an extract from *Hommes* was published in Pattullo (1758).

¹¹ Quesnay's distinction between productive and unproductive activities was still rather undeveloped in 1757: fisheries and mines are productive, and so are merchants, provided they help to increase returns in agriculture by their trading activities (INED 1958 554).

The comparison here is with Cantillon's *Essai* part 1, chapter 12 (which deals with the exchange of commodities between sectors) and part 2, chapters 3 and 4 (on the circulation of money), though both of the Cantillon citations deal explicitly with a closed economy: international trade and monetary flows were brought into his story separately.

Quesnay's treatment of intersectoral transactions was very similar to Cantillon's, but the use he made of it was quite different. Cantillon thought that a state could gain by exporting manufactures and importing agricultural produce, and also that a successful exporting state could, at least for a time, gain by enlarging its money stock relative to that of its competitors (Brewer 1988b). Quesnay wanted France to export agricultural products and thought the money stock could be left to adjust itself. The difference is mainly due to their contrasting views of agriculture. Both saw it as fundamental but Cantillon treated agricultural potential as given, so manufactured production for export would support an addition to population, fed by imports, over and above what domestic agriculture could support.¹² Quesnay, of course, thought that French agriculture was functioning well below potential and was worried that agricultural recovery would be hampered by a lack of demand from the shrunken population. He noted that small trading states like Holland could not rely on their own agriculture but thought that manufacture for export was not worth the attention of a country like France (INED 1958 557, 558–9), and he rejected the claim that producers of manufactured exports were supported by foreign agriculture (INED 1958 584) without properly recognizing that it was based on different assumptions, at least as it was advanced by Cantillon.

By 1757, then, Quesnay had certainly read Cantillon's *Essai*, and there is quite strong evidence that he was influenced by it. It would be quite reasonable to suggest that Quesnay moved from the purely empirical and practical approach of *Fermiers* to a more theoretical and abstract analysis under Cantillon's influence. By 1760 he had developed the key elements of what has come to be known as the physiocratic view of the economy, the notion of the net product and the associated idea of the unique productivity of agriculture, together with the *tableau économique* as a means of showing the links between agriculture and the rest of the economy. Both are implicit in Cantillon.

The *tableau économique*

The first versions of the *tableau économique* were constructed in 1758–9 (see Kuczynski and Meek 1972 for details of the chronology). As Eltis has rightly noted (2002, 41), these first versions were privately produced and seen by very few people, while the (very similar) versions included in Mirabeau's *Ami des Hommes* had a much wider circulation. The position is reversed now, since the first ('Versailles') versions are readily available and the *Ami des Hommes* is not. All the early versions include the famous zigzags showing inter-sectoral transactions within the year. They were

¹² The imports might be of raw materials, freeing domestic land for food production (e.g. Cantillon 1755 85).

dropped from later versions, including most of Mirabeau's *Philosophie Rurale* and Quesnay's later writings, to give the form discussed above, which summarizes inter-sectoral transactions for a whole year. Otherwise, the basic format remained unchanged.¹³

The substance, as well as the formal structure, of the *tableau*, is closer to Cantillon than one might have thought. In Cantillon's model the scale of production is given by the potential of the land together with the consumption choices of landlords (and others) which determine the use to which the land is put. Quesnay, of course, argued that agricultural output was constrained by the poverty of the majority of farmers and thus by their inability to adopt the best techniques. In all of Quesnay's presentations of the *tableau*, however, the starting point is a *tableau* representing the ideal state in which agricultural land is used to its full potential, just as in Cantillon. The *Ami des Hommes* contains a series of modified *tableaux* showing the deterioration of agriculture from various causes, but only after the basic Cantillon-like *tableau* has been developed at length, as a basis from which the other cases deviate.

Quesnay presented the *tableau* by taking a single farm, with an assumed productivity, normally a net product of 100% of the annual advances. The first versions of the *tableau* proceed as if this single farm, generating a revenue of six hundred livres (in the 1759 'third edition' and in the *Ami des Hommes*), represents the whole economy, a device that might have been suggested by Cantillon's single estate, considered 'as if there were no other in the world' (1755-59). To convert this into a model of the whole economy, Quesnay assumed a million identical farms yielding a total revenue of six hundred million. Other versions of the *tableau* use slightly different numbers, but follow the same lines.

None of this, of course, is to deny the importance of Quesnay's *tableau*. It was based on Cantillon in certain key respects, but it was Quesnay who was the first to construct an explicit, tabulated, representation of the whole economy as an interrelated whole. Charles (2003, 2004) has emphasized the impact of the *tableau* as a visual artefact.

The tabular presentation chosen by Quesnay, however, has its drawbacks. The first versions of the *tableau* in 1758-9 show only the circulation of the revenue, that is, the spending of proprietors and its subsequent redistribution through the zigzags. All the subsequent versions are confined to showing inter-sectoral flows and therefore hide transactions within each sector except where the accompanying text spells them out. There has been an extensive literature on the consistency of the different versions of the *tableau*, ending up with what seems to be a consensus that Quesnay must have implicitly assumed that some agricultural goods sold to the 'sterile' sector are then exported in return for imported manufactures, a detail which is hidden within the 'black box' of the sterile sector in the *tableau*. In general, one can say that we now have a reasonably consistent view of the workings of the annual flows underlying the equilibrium *tableaux* (Eltis 1996, 2002 gives an up-to-date summary;

¹³ I take it as read that part 6 of the *Ami des Hommes* and all of *Philosophie Rurale* can be treated as Quesnay's work, or at least as approved by him and, in substance, reflecting his views. This is particularly true of the arithmetic aspects of the *tableau*.

Meek 1963 265–96 is the classic reference; see also Pressman 1994). The out-of-equilibrium *tableaux* showing economic decline, and the zigzags of the early versions, are less well understood.

Out-of-equilibrium *tableaux*

Quesnay used the *tableau* both to illustrate healthy states of the economy and to show what could go wrong. The *Ami des Hommes*, for example, includes a series of *tableaux* illustrating a variety of pathologies. Most are quite straightforward. Thus, if output is assumed to be proportional to advances and if a certain amount, in Quesnay's example (Mirabeau 1756–60 204–13), 50 livres per farm (50m livres for the whole economy) is deducted from the funds available to farmers as advances, because of taxation or in some other way, output must fall correspondingly. In Quesnay's example, advances are reduced from 1050 to 1000 livres per farm, reducing output in total by 128 livres. In the following year, funds are lower again, because it is assumed that the loss made in the previous year falls wholly on farmers' advances, and so on. Quesnay even asked how it is that the economy can continue to function at all, faced with an apparently accelerating degeneration, and replied that it is because the effects are uneven and some places or individuals survive unscathed.

Most discussion has focused on a less obvious case, in which landlords (and others) change the composition of their spending. According to Quesnay's calculation, the system can continue on a constant scale if and only if half of spending is on agricultural products and half on manufactures. If the share of manufactures is greater than half, there is an accelerating downswing, while if it is less than half there is an accelerating upswing (a case that Quesnay did not emphasise). Quesnay worked through this case in the *Ami des Hommes* (Mirabeau 1756–60 192–5), using the early *tableau* with zigzags, and in *Philosophie Rurale* (Mirabeau 1764 III 36–40), using a *tableau* essentially identical to that of my figure 1. I shall consider the latter, for convenience.

The system is assumed to start from a state of equilibrium with a revenue of 2000 (shown as 2 in figure 1). Quesnay now assumed that the proprietors spend only 40% of their revenue on agricultural products and 60% on manufactured products, in place of the 50/50 division in the equilibrium *tableau*, so 800 goes to agriculture and 1200 to the non-agricultural sector. Quesnay also assumed that consumption spending in both sectors is divided in the same proportions as the proprietors' spending, that is, 60/40. The details are tricky: for example the non-agricultural sector has an income of 2400 (from the spending of proprietors and agriculturalists) and spends 1080 on agricultural consumption goods, which is 45% not 40% of income, perhaps because half of the sector's spending is assumed to be for raw materials so the 60/40 division only applies to half of the total. The outcome, however, is clear. The agricultural sector spends more than it receives while the non-agricultural sector receives more than it spends. The agricultural sector ends up with 320 less than it started with. Quesnay assumed that the proprietors absorb half of this loss, but the remainder is assumed to come from agricultural advances, which fall from 2000 to 1840. In the next year's round, the total falls again, and so on. The

version in the *Ami des Hommes* uses different numbers and a different version of the *tableau* to derive essentially the same result.

What is happening here is really quite simple. As Negishi (1989 92) noted, the problem is that the non-agricultural sector is receiving more than it spends and is thus holding unspent money, corresponding to unsold agricultural goods. Negishi's main point was that in an open economy the unsold goods can be exported, restoring the position of the agricultural sector. For a small open economy, home demand and home production can be treated separately. Quesnay did indeed call for free trade to keep agricultural prices up in the face of low home demand, but he also considered trade as a remedy for a tilt of spending towards manufactures and argued that it would not be sufficient.

Even without trade, though, the problem would not exist if manufacturing spent all that it received. That it does not do so, in Quesnay's analysis, is the outcome of a mechanical division of income: the non-agricultural sector retains 60% (or 55%) of its income, come what may. Is there a sensible behavioural basis for this rule? Quesnay offered two different explanations for the fraction of income retained by the non-agricultural sector (and, *mutatis mutandis*, the agricultural sector) in various presentations of the *tableau*, often simultaneously. Either (a) artisans spend a certain fraction of their income on manufactured goods, and hence do not spend it on agricultural goods, or (b) they retain part of their income to restore their advances, previously spent on agricultural raw materials. I will consider these in turn. Quesnay treated them as if they were interchangeable. I will show that they are not.

(a) Suppose that people in the non-agricultural sector spend some of their income on non-agricultural goods. At first sight, one might think that this would remove the corresponding amount of money from the intersectoral circulation. However, the money so spent passes as income to some other person, who in turn spends it on agricultural or non-agricultural products, and so on. If no money is put aside to replace advances or for other purposes, every penny which reaches the sector from agriculture, directly or via the proprietors, must eventually return to agriculture.¹⁴ It is clear that Quesnay did not recognise this. Hence, the use of income to make purchases within the sector, whatever the percentage of income so spent, cannot account for a cumulative decline as Quesnay seems to have thought.

(b) If, however, some part of income is retained and not (immediately) spent, then it is a real deduction from the intersectoral circulation. Quesnay provided for this possibility under the heading of the replacement of advances. Money must be spent on materials and the like before goods are produced, and must be replaced from subsequent sales if production is to continue in future. Correspondingly, if the amount retained to replace advances matches the amount spent at the start of each cycle there is no net deduction. The budget constraint must be respected over the annual cycle. But this constraint will not, in general, be met by an arbitrary percentage deduction from income, since the amount to be recovered is fixed in

¹⁴ Or, more generally, must be spent outside the sector. In this case the sector under consideration is non-agriculture so purchase of agricultural products is the only alternative to passing the money on within the sector.

advance. An arbitrary increase in the proportion deducted, which is what Quesnay assumed in this case, is likely to lead to an accumulation of unspent income, and a deficiency in total spending. Here Quesnay's result can be justified, but only by assuming irrational behaviour by non-agricultural producers.

In Quesnay's equilibrium *tableaux*, the coefficients are such that the 50% of income withdrawn from circulation exactly matches the assumed advances, allowing the circular flow to continue unabated. That may have been a matter of luck – having chanced on numbers which gave him a congenial result, Quesnay stuck to them. He then treated the calculated consequences of any deviation from his assumed proportions as a discovery about the economy rather than as an indication that his arbitrary assumptions needed rethinking. His explanation for the change in spending patterns was that proprietors developed an increased taste for '*luxe de décoration*', and that others, in the agricultural and non-agricultural sectors, followed suit. It seems that he thought that consumer tastes for agricultural and non-agricultural goods determined the fractions passed on to, or subtracted from, the inter-sectoral flow. As has been shown, this cannot be the explanation.

This aspect of the *tableau économique* cannot be traced back to Cantillon, who did not foresee any difficulties arising from circulation (provided there is no large scale hoarding) and did not emphasise the division of spending between agricultural and non-agricultural goods. In Cantillon's framework, the land is the ultimate constraint on output, so the cost of any good, agricultural or non-agricultural, can be traced back to the land required to produce it. Non-agricultural activities are seen as an indirect way of using the amounts of land needed to provide materials and to support the workers concerned. In Cantillon's account of circulation, the division is between town and country, not between agriculture and non-agriculture. He recognised very clearly that spending within the town nets out, so that money received by the urban sector ultimately returns to the country.

The circulation of this money takes place when the landlords spend in detail in the city the rents which the farmers have paid them in lump sums, and when the undertakers of the cities, butchers, bakers, brewers, etc. collect little by little this same money to buy from the farmers in lump sums cattle, wheat, barley, etc. In this way all the large sums of money are distributed in small amounts, and all the small amounts are then collected to make payments in large amounts, directly or indirectly, to the farmers. (Cantillon 1755 125-7)

Cantillon recognised that individuals had to be wealthy enough to make the necessary investments if they were to go into production on their own account, but he did not take any account of general (or sectoral) shortages of capital as a constraint on production. That is the most important difference between Cantillon and Quesnay. Correspondingly, there is no special role for advances in Cantillon's account of circulation. He implicitly assumed an economy in which the same pattern of production rolled on from year to year, so within each year each individual (at least on average) spends the money income that he or she receives. This is what happens in Quesnay's equilibrium *tableaux*, but not in the *tableaux* showing decline (or expansion) depending on the division of spending.

Conclusion

Quesnay's view of the (French) economy was quite different from Cantillon's. Cantillon treated agricultural productivity as essentially given and unchanging, and he saw policy primarily in terms of international competition in trade and manufactures. His economic analysis went well beyond his predecessors, but his focus remained 'mercantilist', which is perhaps not surprising considering his career as a merchant and financier in the great urban centres of the time (Murphy 1986, Brewer 1988b, 1992). Quesnay, by contrast, thought that French agriculture had declined catastrophically from an earlier peak, but could be restored with appropriate policies. This difference conceals a very close similarity in their analysis of the relations between agriculture and manufacturing. The *tableau économique*, and the analysis it embodies, were based quite closely on Cantillon's verbal account of intersectoral circulation. The main exposition of the *tableau*, in a succession of Quesnay's works, represents an unchanging, good state of agriculture, and is therefore closer to Cantillon than one might expect. When Quesnay tried to use the *tableau* to show disequilibria, and the resulting changes in agricultural production, however, Cantillon could no longer act as a template for him to follow.

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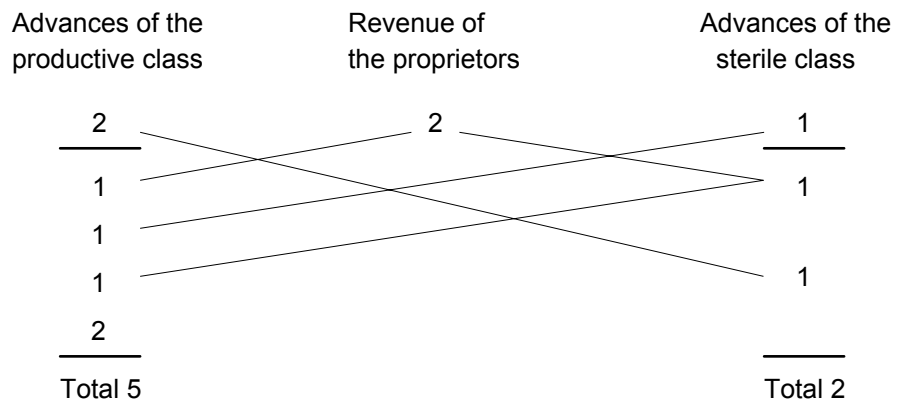


Figure 1: Quesnay's *tableau*.

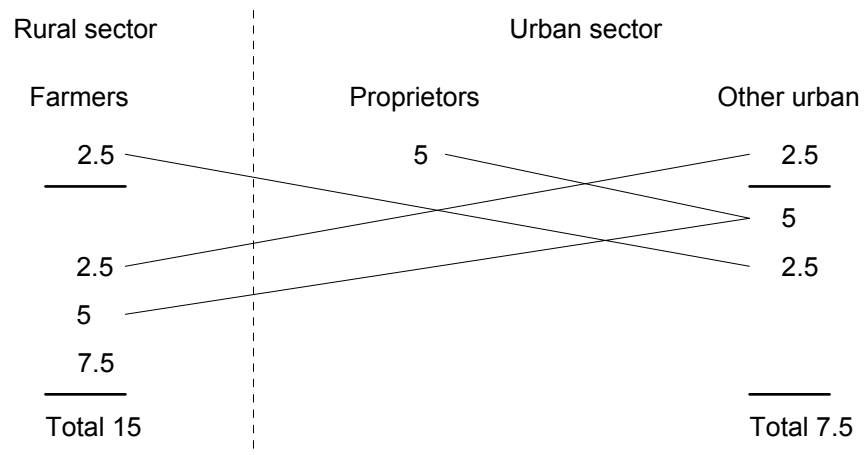


Figure 2: Cantillon's analysis of circulation