

Sir William Petty, Ireland, and the Making of a Political Economist, 1653-1687

By ADAM FOX

The importance of Sir William Petty in the history of history of economics is well established. In his principal published works of economic theory - the Treatise of taxes and contributions (printed 1662), Verbum sapienti (written 1665, printed 1691), Political arithmetic (largely written 1672, printed 1690) and Quantulcumcunque concerning money (written 1682, printed 1695) - he outlined a number of theories and concepts that are now staple components of the modern discipline. Among other achievements, he made pioneering contributions to the study of money by identifying the importance of its velocity of circulation and the multiplier effect. He was one of the first to formulate theories of interest and differential rent, and to clarify the distinction between price and value. He conceived an early form of the labour theory of value, he recognised the advantages of task specialisation in manufacturing, and he noted the tendency towards leisure preference among pre-industrial workers. He was well ahead of his time in advocating national accounting, arguing for proportionate taxation, and proposing public works as a remedy for unemployment.¹

In terms of his methods, Petty was the first British economist to employ a thoroughly statistical approach, believing that only by quantitative analysis could precise reasoning be achieved and accurate conclusions reached. He produced informed calculations relating to numerous economic and social phenomena and in so far as he had some influence on John Graunt's Natural and political observations on the London bills of mortality, published in 1662, he contributed to both a seminal work of statistics and a pioneer exercise in historical demography.²

Petty was much more than just a theorist, however. He was of the generation that inherited the Baconian idea that knowledge should be useful and, as one of the

utopian reformers who gathered around Samuel Hartlib in the mid-seventeenth century, he developed an enduring preoccupation with society's improvement. When he began, in the second half of his life, to investigate the structure of economies and the ways in which they functioned, it was always with a view to advising those in power on how best to enhance national efficiency and prosperity. He imbibed from his mentor, Thomas Hobbes, the philosophy that the ends of government are to secure the 'peace and plenty' of the State and he saw the role of what he called 'political oeconomics' as demonstrating how these goals might best be achieved.³

The importance of Ireland in Petty's life and thought has long been recognised. Between his first arrival on Irish shores in 1653 and his death in 1687, he was to spend two thirds of his time in the country. Ireland was the context for his greatest practical achievements: after the Cromwellian confiscations of land in the wake of 1641 rebellion, Petty orchestrated the measuring and mapping of nearly 8,400,000 Irish acres of which the products were the immense 'down survey' of 1656 and the atlas Hiberniae delineatio eventually published in 1685.⁴ It was also the source of his fortune: in the course of official duties he was able to amass substantial properties of his own scattered in King's County, and Counties Meath, Cork, Limerick, as well as in Kerry where he was to acquire a further 160,000 acres in 1668.⁵ Moreover, Ireland was the subject of a significant number of his published and unpublished works. In addition to several accounts of his activities there under the Commonwealth, it became the biggest single focus of his writing on political economy by the 1670s.⁶ His Political anatomy of the country was written in 1672 and printed in 1691 and his two sets of Observations upon the Dublin-bills of mortality were published in 1683 and 1686. Speculum Hiberniae, written in 1686, and his last work of 1687, A treatise of Ireland, were left in manuscript, although the later was printed, together with his other major works on Ireland in Hull's fine edition of his economic writings at the end of the nineteenth century.⁷

Petty was famously reticent about sending his work to the press and on his death he left a large personal archive of letters, position papers and schemes, the '53 chests' of manuscripts that he described as 'so many monuments of my labours and misfortunes'.⁸ A representative selection of these was published by Lansdowne in 1928 and since their deposit at the British Library in 1993 the content and value of the extant Petty papers has been appraised by Harris and Aspromourgos.⁹ As Harris makes clear, the archive reveals an even more significant role for Ireland as a preoccupation in Petty's writing than his printed works alone might suggest, with over two-thirds of it concerning Ireland or reflecting upon Anglo-Irish relations. 'Of the fifty-nine volumes in which the archive is now arranged, thirty five are entirely about Irish matters and many more, including the correspondence, contain related material'. Among the many well-known factors that contributed to the development of Petty's ideas and frame of reference, therefore, Ireland appears to loom larger than was once generally appreciated. 'It was not the intelligence networks of Samuel Hartlib or the London bills of mortality or the gatherings of the Royal Society which were Petty's chief sources of intellectual stimulus; it was Ireland'.¹⁰

To be sure, much of the material in the Petty archive relating to Ireland comprises correspondence and notes concerning the management of his estates and business interests, including the many lawsuits in which they embroiled him. But it is debateable whether the substantial remainder can be said to be of 'little interest' so far as his economic thought is concerned.¹¹ It is suggested here that Petty's working papers are of real importance in providing the context, and explaining the origins, of many of his significant economic ideas. Furthermore, they emphasise the extent to which Petty was not principally a theoretician but rather a practical political economist, and that it was Ireland that galvanised his thinking, furnished his most immediate raw material and provided the context for his proposals and policies.

I

The basic cast of Petty's mind was formed well before his first arrival in Ireland as an ambitious thirty year old. During the 1640s, his experience of the advance commercial economy of the Netherlands, his exposure to Hobbes and his coterie in Paris, and his membership of the Hartlib circle back in London, provided formative influences of enduring significance. Among other things, these years instilled in him an interest in economic and social reform on the basis of systematic data collection and analysis in precise quantitative terms. It was arguably the 'down survey', and his subsequent service under the Commonwealth government in Ireland, that was responsible for turning him into a practising political economist, however. As he confessed, the survey, completed within just thirteen months between February 1655 and March 1656, greatly stretched his 'own capacity and intellect, the which is not only formed and fashioned, but much expanded by such employments'.¹²

It was this exercise which helped to convince Petty of the need for reliable quantitative information as the basis for decision-making in government. As a result, he would consistently argue for the creation of something like a national audit office, to encompass not merely England and Ireland but all other of the king's territories and dominions, and headed by an 'Accountant General of the People'. The purpose of such an office would be to collect vital statistics towards calculating the size, age distribution, and sex ratio of the population. It would provide a land registry, recording the ownership and transaction of all property as a means of ensuring security of title. And it would keep accounts of the kingdom's trade at home and abroad, its customs revenues, taxes and prices, thereby to quantify gross national income and product.¹³

Although repeatedly urged upon those in authority, such proposals were never realised and Petty had to be content to base his economic and demographic

calculations for England on the partial and discontinuous records of the customs, excise and hearth tax that were available to him. He admitted a good deal of guess work in his figures and confessed to hoping that 'no man takes what I say'd about the mocion and burthen of horses and the living and dying of men for mathematical demonstracion...'. So it was that, at the end of the seventeenth century, Davenant could famously acknowledge that although the 'art of reasoning by figures' as applied 'to the particular objects of revenue and trade' was 'something Sir William Petty first began . . . his skilful hand did all along want right materials to work upon...'.¹⁴

In the case of Ireland, however, Petty was in a much stronger position. A combination of the evidence amassed by the 'down survey' together with that compiled by the poll tax returns of 1660, and the subsequent records of the hearth tax, amounted to a body of economic and demographic data about a single country as good as any then available in Europe. Petty collected all of this material, some of which he kept in a file of statistical papers together with figures for the Irish customs and excise, imports and exports for each of the country's major ports, and other indices of income and expenditure.¹⁵ These various sources were, of course, far from complete or reliable. The 1660 poll tax may have listed only those over fifteen years old, while it omitted five counties entirely and thirteen of the baronies within a further two. The 'down survey' encompassed only 22 of the 32 counties. In his calculations for Irish population, therefore, Petty had to fill in such gaps by estimation and extrapolation, no less than in the case of England and Wales. In fact his totals of 850,000 in 1652, 1,100,000 in 1672 and 1,300,000 in 1687, were probably too low. Nevertheless, they represented easily the most complete and accurate figures produced prior to 1821, while, his figures for Irish revenues have yet to be substantially modified by historians.¹⁶

The sources with which he worked enabled Petty to break down his population figures into Irish and 'old English' inhabitants, Scottish and English settlers, and to establish therefore, the relative numbers of Catholics and Protestants. The hearth

tax returns also established the quantity and size of houses, and by extension the number and wealth of families. Thus among 1.1 million people upon whom Petty reckoned at the time of his writing the Political anatomy of Ireland in 1672, there were 800,000 Irish, 200,000 English and 100,000 Scots. But whereas Irish and old English Catholics comprised about three quarters of the population, it was by this date Protestant settlers who owned three quarters of the land. They also occupied five sixths of all the housing, including nine tenths of the private property in walled towns, and controlled two thirds of the foreign trade. Among the country's 200,000 families, 160,000, all of them Irish Catholics, lived in no more than 'cabins' with 'neither chimney, door, stairs or window'.¹⁷

When it came to comparative demography of London and Dublin, the Irish sources were clearly inferior. Following his collaboration with Graunt on the London bills of mortality, which had been 'a new light to the world', Petty attempted to subject a sample of Dublin bills to similar analysis. Graunt had succeeded in demonstrating, for the first time, long-run patterns of fertility and mortality in a given population. He had also established the sex ratio and age structure of the English capital, originating in the process the notion of the life table and life expectancy. Petty wanted to do the same for Dublin in the belief that such information was the foundation 'of publick oeconomy, and even of that policy which tends to peace and plenty'. Whereas Graunt had based his findings on data derived from a continuous run of bills between 1604 and 1660, however, Petty took just 'six stragling London bills' from the years 1668-1680 as a basis for comparison with fifteen Dublin bills from the years 1656-1680, together with a record of 'the families and hearths in each parish' of the city. He revised his initial findings in the light of a further Dublin bill for 1682.¹⁸

While he lacked the sources to approach Graunt's level of analysis he was at least able to establish that in both cities there were five births to every eight burials, so that in Dublin as in London, substantial in-migration was required to maintain the population. On the one hand, the returns revealed that there were 6,025 houses in Dublin

in 1682 which represented a total of inhabitants 48,200, if the multiplier of 8 people per household suggested by the London Observations was equally valid here. On the other hand, they showed that 2263 people had died that year, and on the basis of London findings that 1 person dies in every 30 this would have given a total population of 67,890. Thus Petty decided to middle the two figures, arriving at a figure of 58,045. This partiality of the sources and such levels of extrapolation based upon known quantities were typical of the way in which Petty worked, or was obliged to work. He recognised these inadequacies, but his methods remained more scientific and his result more accurate than anything else yet attempted for the Irish capital.¹⁹

To some extent the precise accuracy of the figures was less important to Petty as a political economist than the lessons they taught about the health and wealth of a city or nation. He was interested in what it was that made societies prosper and in recommending the means by which that prosperity might be increased. His experience of the Dutch economy and his tutelage by Hobbes had convinced him that national riches depended not primarily upon territorial size and agricultural productivity but upon manufacture and trade. Wealth resided not so much in land as in people, and in their ability to produce and exchange goods with others. Despite confined territory and limited natural resources the Dutch had enriched themselves spectacularly on the basis of industry and commerce and the contrast with what he found in Ireland struck Petty forcibly. Here, he believed, was a country with plentiful resources but with a population not only insufficient in size to exploit them, but also inadequate in productivity to fulfil its economic potential.²⁰

Thus he calculated in the 1680s that whereas England and Wales had a land mass of 36 million acres and a population of 6 million people, or an average of 6 acres for every man, woman, and child, Ireland's 18 million acres gave it a ratio at that time of almost 14 acres per person. Even England and Wales fell well below the 'three acres of land for every head' which he considered to be 'sufficient peopling'.²¹ In the case

of Ireland, moreover, severe under-population was exacerbated both by the chronic under-employment of the people and the extreme under-development of the economy. As a result, Ireland not only had a smaller population per acre ratio than England but also a lower output per head. In order to demonstrate this statistically Petty needed a formula that would be able to measure relative economic efficiency. For this he had to be able to assess the value of the two great inputs to production in contemporary economies, land and labour. It was in the Political anatomy of Ireland, that he returned to what he saw as 'the most important consideration in political economics', namely the ability 'to make a par and equation between lands and labour, so as to express the value of any thing by either alone.' The value of these two factors could be established by calculating what each could produce in the absence of the other. Thus the value added to untended livestock on an acre of land over a year was equivalent to the annual rental value of that land. The value added over and above this by the work of one person for a year was equivalent to the value of labour, or wages.²²

By computing, on the basis of the best available evidence, the total product of England and Wales, and then subtracting the total rental value of its land, Petty arrived at a figure for the value added or every man woman and child, assuming an average of about five acres per head. This came to £69 in 1664, £83 in 1685 and £90 in 1687.²³ At the same time, he seems to have taken as his equivalent figure for Ireland in 1672 that usually used for slaves, namely £15 per head, although a more measured calculation put the figure at £70 by 1687, the same as for Scotland.²⁴ As a result Petty estimated that Ireland, not merely because it had about half the total acreage of England and Wales, but more fundamentally because it had significantly poorer acre and output per head ratios, had a national product only one ninth that of its neighbour kingdom. However faulty Petty's assumptions, and however inadequate his calculations, he was one of the first people to think in these terms, perhaps the first political economist to measure the productive relationship between land and labour and to quantify the value of one in terms of the other. The majority of

his writing would be concerned with the ways in which the value of these inputs to production might be increased and it was Ireland above all that he used as a test case.

In economic thought prior to the mid-seventeenth century, it had been axiomatic that an increase in a nation's wealth resulted either from an increase in its territorial size or in its stock-pile of treasure, derived from selling more goods as exports than it bought as imports. At the same time, it was usually believed that an increase in population was likely to precipitate economic decline. It would represent a drain on finite natural resources, result in more competition for jobs, which would force down wages, and mean increased competition for land, which would raise rents.²⁵ But Petty stood this argument on its head. 'Fewness of people, is real poverty' was his claim. He gave sustained elaboration to Hobbes' idea that wealth was fundamentally dependent 'on the labour and industry of men'. If land is the mother of wealth, his famous formulation ran, it is labour that is its 'father and active principle'. As he put it in one set of manuscript proposals for creating wealth in Ireland and England, 'enriching a nation is encrease of people, men of industry and skill in producing such commodeties as the whole nation generally esteemes'. The greater a population, therefore, the greater its capacity to generate wealth through work, production and trade. A country is made richer when increased labour power extracts a larger surplus from the land, when a greater percentage of that surplus is exchanged for commodities from abroad, and when its productivity per head relative to that of other countries rises.²⁶

When in 1685 Petty's friend Sir Robert Southwell responded to his theories about the 'multiplication of mankind' with the traditional objections that as population grows the value of labour will fall and mortality rates will increase, he replied with an analogy drawn from his experience of trying to develop the fishing industry at Kenmare in Kerry. 'I say that the more pilchards...were taken, the better price they yield...for when they bee few, merchants will not come to fetch them; and when we have not

enough of them to load a ship, nor other goods to make up a freight, our pilchards are under-valued. But quitting the instance of pilchards, I say that in Holland or Zeeland (the thickest peopled countrys I know), the worth of men and of their days labour is greater than in Kerry or Connaught, and there also are fewer beggars.²⁷ He calculated, on the basis of yields per acre across the king's European dominions, that if the population were to double in twenty five years the labour of just two-thirds of the people working no more than twelve hours a days would be sufficient to maintain them all.²⁸

As a general principle, Petty believed that to double the population of a nation would be to make it more than twice as rich. The basis for this was his estimation that 'the doubling of the people doth quadruple the value of lands', or that every arithmetic rise in population was accompanied by a geometric rise in rental values. 'The addicon of the people doth not onely increase the rent in proporcon to the respect of numbers, but in proporcon to the squares of such numbers', he observed, 'as for example, if the inhabitants of anie countrie bee 3 millions and shall bee increased to 4, the value of land shall not only increase from 3 to 4, but from 3 times 3, which is 9, to 4 times 4, which is 16...'. This fact was, he thought, 'by experience visible in Holland and other peopled countries'.²⁹ Such a theory of the relationship between population increase and economic growth not only flew in the face of conventional economic thought, but also represented the antithesis of the Malthusian analysis followed by the classical economists of the nineteenth century.

In the case of Ireland, the value of the land had become so artificially low after the depredations of the years following the rebellion that he believed a doubling of population would not quadruple but sextuple it. Looking back on the generation that he had spent in the country, the evidence appeared to bear this out. In the thirty-five years between the 1652 and 1687, an increase of over 50 per cent in the Irish population had been accompanied by a three-fold increase in the rental value of land. At the same time he could point to other indicators of economic growth in

corroboration of the principle that people generate wealth. Interest rates had been cut by a third over the course of this period, from between 20 and 25 per cent to between 7 and 8 per cent. Over the twenty-one years before 1684 the value of the hearth tax collected from Dublin had doubled as had the customs and excise returns yielded by the country as a whole. Overall, since 1640 the king's Irish revenues had tripled by 1671 and quadrupled by 1683. He estimated that exports of beef, butter and sheep to England had risen by about a third in the decade or so prior to the passing of the Cattle Acts in the 1660s and that Irish woollen manufacture was beginning to take off. Looking at the three kingdoms as a whole in the mid 1680s, he argued that if the population of England, Scotland and Ireland were to double over the following twenty five years, personal wealth in each of them would be doubled and their foreign trade would be tripled, their interest rates would fall to three per cent and the expenses of government would be reduced to just one per cent of the expenditure of the people.³⁰

Unlike both earlier and later economic thinkers Petty also argued that while demographic expansion was likely to raise the value of rents, and with them the value of prices, it would also result in higher levels of demand and provide a stimulus to higher wage rates. The more wages people had to spend, the more goods would be produced and the more employment generated. He was probably the first person to identify the essence of the multiplier: '...a hundred pound passing a hundred hands for wages, causes 10,000 l. worth of commodities to be produced, which hands would have been idle and useless, had there not been this continual motive to their employment.' For this reason he was concerned about the way in which Irish planters spent the money earned from their Irish estates in England where their were more luxuries to consume. It was, as a result, the English economy that benefited in terms of employment and production rather than the Irish. The situation was analogous to that within England itself where country squires spent the proceeds of their provincial estates in London with the consequence that the capital city expanded at the expense of 'remote parts'. Here, as in other ways, Petty tried to practice what

he preached. In his will he desired that his daughter Anne 'might marry in Ireland' so that the ten thousand pounds he left her in his will would not be carried out of the country.³¹

It was with all these beneficial consequences in mind, then, that Petty came up with his scheme to increase the number of people per acre in Ireland to be equal to that of England within a single generation. He proposed to raise Irish population from his figure of 1,250,000 in the mid 1680s, to 4,500,000, and as a consequence to increase national wealth by £400 million, from just one ninth of that of England to five ninths. Such a goal, he believed, made the 'project of encreasing the people...the most glorious design that ever was'. To achieve this he proposed a wholesale reciprocal transplantation of English and Irish people, especially adolescents and women of child-bearing age. Graunt's work on the London bills of mortality had indicated that in the English capital there were 14 males for every 13 females. In Ireland, however, the figures suggested at ratio of just 13:12 ratio, making the need for 'teeming' women the more urgent.³²

His remedy took the form of a five-year plan for emigrating 100,00 Irish Catholic families who spoke little or no English, and distributing them evenly around England such that there would be one for every eleven indigenous families. Among them were to be 40,000 unmarried women aged between 15 and 30 years old and 10,000 youths of between 15 and 20 years. The consequence would be their Anglicisation in religion and language and their education in manufacturing skills and trade. In return, 100,000 of the families which the English hearth tax returns revealed to be 'insolvent', were to be shipped in the other direction, including the return of 40,000 'teeming' women, 'to marry with Irish men, so as each familie may have English mothers or mistresses in it', together with 10,000 youths who would become soldiers.³³

This radical proposal of social engineering clearly seemed, as Petty acknowledged, to be as 'impracticable and intollerable' to contemporaries as it might in retrospect

and was, no doubt, just another of example of the 'aying at impossible things' of which Charles II accused him.³⁴ Yet in the context of the forcible eviction, transplanting and transportation of so many Irish Catholics in the wake of the act of settlement in 1652, and the subsequent influx of English Protestants, about 1,000 adventurers and 12,000 soldiers, to take their land, Petty's ideas seem no more than commensurate with the circumstances of the day.³⁵ He was not the first Englishman to think that the best way to improve the Irish is to make them more like the English, and he would not be the last, but his was at least a perspective underpinned by a reasoned theory of economic growth. 'If people increase, plantation must increase', he opined in the early 1660s; 'if plantation doe, (that is if native comodityes increase) either manufacture or exportation must increase likewise'.³⁶

II

Petty's solution, then, to the problem of promoting economic growth in Ireland was to both to expand the population and to Anglicise it. He believed that the country not only needed more people but also that their basic productive capacity had to be enhanced. The 160,000 Irish families, or 80 per cent of the population, who inhabited the 'nasty cabbins' lived in an environment that was essentially unsuitable for domestic manufacture and Petty proposed its immediate reform as a first step towards economic regeneration. In it 'neither butter nor cheese, nor linen, yarn nor worsted, and I think no other, can be made to the best advantage; chiefly by reason of the soot and smoaks annoying the same; as also for the narrowness and nastiness of the place; which cannot be kept clean nor safe from beasts and vermin, nor from damp and musty stench, of which all the eggs laid or kept in those cabbins do partake. Wherefore to the advancement of trade, the reformation of these cabbins is necessary.' Only then could progress be made in the better organisation of the workforce and the greater orientation of production towards the market.³⁷

Petty recognised, however, that stimulating economic growth was as much a matter of changing attitudes as it was of reforming environment. The 'cabbins-men' lived a largely self-sufficient life, on the margins of the monetarised economy, and as long as that was so they lacked the incentives and the opportunity to enter the market place. They 'use few commodities', he observed, 'and those such as almost every one can make and produce. That is to say, men live in such cottages as they themselves can make in 3 or 5 days; eat such food (tobacco excepted) as they buy not from others; wear such cloaths as the wooll of their own sheep, spun into yarn by themselves, doth make; their shoes, called brogues, are but 1/4 so much worth as a pair of English shoes; nor of more than 1/4 in real use and value'. Petty reckoned that the whole annual expenditure of such people was no more than 52 shillings per head.³⁸

He identified in the mass of the labouring poor a level of economic expectation geared to the satisfaction of needs rather than the maximisation of wants and he realised that altering attitudes towards production and consumption were as important as providing the conditions which made them possible. Rising real incomes were not always enough in themselves to generate higher levels of expenditure among a population used to living on or below subsistence. Although by no means the first to observe the tendency, he was perhaps the first to integrate into a coherent analysis the idea of leisure preference, or the backward sloping supply curve for labour. His early experience amongst the poor clothiers of Romsey in Hampshire was corroborated by his later familiarity with the peasantry of Ireland in demonstrating the tendency of contemporary workers, in circumstances where wages rise or prices fall, to work fewer hours rather than more.³⁹

In such contexts, people labour sufficiently to satisfy basic material needs and lack the incentive to earn more since there are few luxuries to buy, no means of saving, and because their levels of expectation are low. In an environment when work is often hard and unpleasant, leisure can be a more valuable commodity than goods and workers realise their higher wages in the form of rest rather than consumption. 'It is observed by clothiers, and others, who employ great numbers of poor people', Petty remembered, 'that when corn is extremely plentiful, that the labour of the poor is proportionably dear: and scarce to be had at all (so licentious are they who labour only to eat, or rather to drink)'. Equally, when the potato was introduced to Ireland, he thought, 'a day or two hours labour was there sufficient to make men live after their present fashion, and the cheapness of food was the excuse for the people to live in a condition little above that of animals'.⁴⁰

In order for economies to grow people needed to be persuaded not only to want to earn more money but also to spend it. 'Encrease of trade', he wrote, 'depends chiefly and naturally upon encrease of people and luxury in their consumption',

among other contingencies. Gratuitous expenditure and conspicuous consumption were not to be guarded against, as moralists had always tended to argue, but encouraged as stimuli to production. Luxury was not a sin but a wealth creator. He wanted the government to pass laws 'to beget a luxury in the 950,000 plebeians of Ireland, rather than making sumptuary laws directed against the expenditure of the 150,000 optimates, as the latter would only injure the plebeians, while the former would promote their splendour, arts and industries.' He recognised that the State had an important role to play here as in other contexts. Indirect taxes, such as the excise on commodities, he argued, should be on few goods and at low levels, not only because they were regressive but also because they discouraged consumption. Taxation should be used instead to transfer wealth from 'the landed and lazy, to the crafty and industrious'.⁴¹

Population growth was also beneficial because it resulted in the expansion of urban centres. Petty contrasted England, where he calculated that by the 1680s about 29 per cent of the population was urbanised and 9-10 per cent lived in London, with Ireland where only 10 per cent dwelt in towns and cities and just 3 per cent in Dublin. It was precisely in such environments that expenditure on luxuries was stimulated, for 'the inhabitants of cities and towns, spend more [on] commodities, and make greater consumptions, than those who live in wild thin peopled countries'. In these more densely populated environments the constant 'sight, observation, and emulation of each other' encouraged people to consume conspicuously for the sake of appearance. Moreover, it was also the populousness of cities that helped to promote and streamline the process of manufacture. Here 'manufactures will beget one another, and each manufacture will be divided into as many parts as possible, whereby the work of each artisan will be simple and easie...'⁴²

It has often been pointed out that in undertaking the 'down survey' Petty put into practice the idea of the division of labour as a means of maximising both quality and efficiency. As one contemporary account of the survey put it: 'The said Petty,

considering the vastnesse of the worke, thought of dividinge both the art of makeinge instruments, as alsoe that of usinge them into many partes'. In the context of his observations on urban life he later applied this principle to manufacture in general and, a century before Adam Smith's celebrated example of the pin factory, suggested: 'In the making of a watch, if one man make the wheels, another the spring, another shall engrave the dial-plate, and another shall make the cases, then the watch will be better and cheaper, than if the whole work be put upon any one man. And we also see that in towns, and in the streets of a great town, where all the inhabitants are almost of one trade, the commodity peculiar to those places is made better and cheaper than elsewhere.'⁴³

Petty believed that religion was another factor that had an impact on economic attitudes, and here again his experience in Ireland was instrumental in shaping his views. While he refused to accept the typical colonial prejudice that the Irish were naturally lazy, he tended to share the Protestant sentiment that Catholic priests discouraged 'the mischiefs of setting up manufactures, and introducing of trade'. This influence, together with the many saints' days in the Roman Church, resulted in the loss of too much productive time, 'unnecessary churchmen and holydayes being a great damage to an underpeopld country'. He thought that the ethos of the faith was inimical to enterprise since it taught that a simple way of life 'like the patriarchs of old, and the saints of later times' was to be followed. The increase of Protestantism within Irish society, he implied, could only help to remedy a situation in which the vast majority of families, 'having 300 days in the yeare to work in (excluding out of 365, 52 Sundays and 13 hollidayes) they are observed not to labour effectively above 2/3 ds of the sd 300 dayes; partly for want of work, partly by reason of their overplus holidays, and partly for want of strength and skill, their food being insufficient for much labour. So as two thirds of the said familys (being 147) labouring stoutly and dexterously their 300 dayes par are equivalent to the whole number working as now they doe.' It followed that if the existing population could just be fully employed, their productivity would immediately rise by 50 per cent.⁴⁴

Whatever his misgivings about Catholicism, however, both on economic and dogmatic grounds, Petty remained a firm advocate of religious toleration as the surest means to ensure the 'peace and plenty' of a nation. Again he could cite the Dutch as providing the best evidence of this. Although he believed that 'trade is not fixt to any species of religion as such', he anticipated a famous thesis by claiming that it thrived among dissenters in particular, the heterodox elements within society who 'are for the most part, thinking, sober, and patient men, and such as believe that labour and industry is their duty towards God'. He estimated that three quarters of the world's trade was in the hands of such people. In this calculation he conveniently included the Catholic merchants of the major Irish towns, as dissenters from the ruling Protestant state, and 'the truth whereof appears also in all the particular towns of the greatest trade in England'.⁴⁵

The logical conclusion of Petty's ideas about the repopulation and Anglicisation of Ireland was his proposal for formal political union between the three kingdoms, something that he advocated from at least the early 1670s. This he believed would consummate the increase 'in peace and plenty' which his schemes for demographic and social engineering were designed to promote. In terms of the 'plenty' issue, Petty argued that Union would enrich all parties. It would remove trade barriers to good effect, noting that 'the price of land hath fallen in England ever since the prohibition of Irish cattle, but will more probably rise upon the Union', and it would encourage Irish landowners not to spend their estates in England but keep their wealth at home. It would make tenancies more secure and, by clarifying the discrepancies in the constitutional relationship between the two countries, mutual exchange would be facilitated and the costs of government reduced. Finally, Union was 'a probable means to get the reall sovereignty of the seas, and to undermine the Hollanders trade at sea, and both without war and bloodshed'. In terms of enhancing 'peace' Petty believed that uniting the kingdoms and granting religious toleration throughout would undermine the threat of Catholic rebellion in Ireland and also its

vulnerability to invasion from France. By encouraging more English Protestants to settle in Ireland it would foster the cause of assimilation between the two peoples.⁴⁶

To this end, Petty formulated detailed proposals for a newly constituted House of Commons at Westminster as well as for representative assemblies in Ireland and Scotland.⁴⁷ He outlined plans for the redrawing of constituencies so that parliament became a more accurate representation of the distribution of population, and he suggested new parochial divisions that would also form the basis for the reorganisation of the Church in each of the kingdoms along more rational principles.⁴⁸ In Ireland, he argued, the number of clergymen within each parish should be regulated so as to be more proportionate to the number of communicants and more reflective of the distribution between Catholics and Protestants.⁴⁹

III

It is not possible to explain the origins, or understand the derivation, of many of Sir William Petty's economic ideas without appreciating the influence that Ireland had upon his thought. Even his works in which Ireland was not the principal focus of attention were deeply influenced by his long experience in the country. Petty was not an academic economist or demographer. He considered himself an advisor to government, who set out to understand economic behaviour and to avail himself of quantitative data for the purpose of making policy suggestions to those in authority. He coined the term 'political arithmetic' to describe his methods and was probably the first person to use the English 'political economics' to denote the study of commerce as a branch of statecraft. Like the modern development economist, he took a poor country as the object of his enquiry and was concerned both at the macro level with promoting its long-term economic growth and at the micro level with reforming the incentives and decisions of its households.

It was in the intellectually innovative and radical climate of the 1640s and 1650s that Petty's mind was formed and this schooled him in a new political economy that saw manufacturing and trade as the keys to material prosperity and national interest. From this starting point he elaborated the idea that density and productivity of population were the foundations of wealth creation. In so doing he drew on first hand observation, with the 'thick peopled' economy of the Dutch and the 'thin peopled' society of the Irish representing the two ends of the spectrum. There is a sense in which Petty always remained a member of the Hartlib circle and in his constant flow of schemes for the improvement of society he perpetuated the legacy of that utopian group into the reign of James II. The temper of the mid seventeenth century, which had seen Ireland as a blank sheet upon which to write the story of scientific and rational reform, stayed with Petty over thirty-five years. Only when the total compass of his activities and concerns is revealed by the sum of his collected papers is it evident just how crucial was Ireland in the making of him as a political economist.

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² Graunt, Natural and political observations. On Graunt, see Greenwood, Medical statistics from Graunt to Farr, pp. 27-39; Glass, 'John Graunt and his natural and political observations'; Sutherland, 'John Graunt: a tercentenary tribute'; Hacking, Emergence of probability, pp. 102-10; Endres, 'The functions of numerical data'; Kreager, 'New light on Graunt'; Lynch, Solomon's child, pp. 197-231.

³ Sharp, 'Sir William Petty and some aspects of seventeenth-century natural philosophy', ch. 1; Skinner, 'Thomas Hobbes and his disciples in France and England'; Buck, 'Seventeenth-century political arithmetic'; Amati and Aspromourgos, 'Petty contra Hobbes'; Webster, The great instauration, pp. 428-44.

⁴ Petty, The history of the survey of Ireland, ed. Larcom. Six volumes of the survey are now B.L., Petty Papers, Add. MS 72,868-72,873. See Goblet, La Transformation, I, 207-351; Barnard, Cromwellian Ireland, pp. 213-48; Andrews, Plantation Acres, pp. 63-72; *idem*, Shapes of Ireland, pp. 118-52.

⁵ Barnard, 'Sir William Petty, his Kerry estates and Irish population'; *idem*, 'Sir William Petty, Irish landowner'; *idem*, 'Sir William Petty as Kerry ironmaster'.

⁶ Petty, A brief of proceedings; *idem*, Reflections upon some persons and things in Ireland; *idem*, The history of the survey of Ireland, ed. Larcom.

⁷ Three drafts of the Treatise of Ireland are in British Library (hereafter B.L.), Petty Papers, Add. MS 72,886, fos. 1-45 and fair copy is in B.L., Add. MS 21,128, fos. 52-129 from which it is printed in Hull, ed., Economic writings, II, pp. 545-621. Equally, there are three copies of the Speculum Hiberniae in B.L., Add. MS 72,884, fos. 8-53, and a final version in B.L., Add. MS 21,128, fos. 38-51.

⁸ Lansdowne, ed., Petty-Southwell correspondence, pp. 138, 220; cf. Aubrey, Brief lives, ed. Clark, II, p. 146. On Petty's reticence about printing his work, see Fitzmaurice, Life of Sir William Petty, p. 262; Lansdowne, ed., Petty-Southwell correspondence, p. 61; Lansdowne, ed., Petty papers, II, p. 201; B.L., Petty Papers, Add. MS 72,884, fo. 4r.

⁹ British library catalogue of additions to the manuscripts: the Petty papers; Harris, 'Ireland as a laboratory'; Aspromourgos, 'The mind of the oeconomist'.

¹⁰ Harris, 'Ireland as a laboratory', p. 84; cf. Aspromourgos, 'The mind of the oeconomist', p. 70. The point was appreciated long ago by Goblet, La Transformation, II, 308.

¹¹ Roncaglia, Petty: The origins of political economy, p. 6.

¹² Barnard, Cromwellian Ireland, p. 219.

¹³ B.L., Petty Papers, Add. MS 72,866, fos. 37-52, 75-92; B.L., Add. MS 72,880, fo. 13r, 38-41, 60-71; and cf. Lansdowne, ed., Petty papers, I, pp. 100-15, 171-2, 178-9.

¹⁴ Fitzmaurice, Life of Sir William Petty, 258; Davenant, Discourses on the public revenues (1698), in Whitworth, ed., Political and commercial works, I, p. 128. On Petty's own recognition of the limits of quantification, see also Aspromourgos, 'New light on the economics of William Petty', pp. 66-7.

¹⁵ Petty's collection of statistical papers is now B.L., Petty Papers, Add. MS 72,890. His copy of the 1660 poll tax is B.L., Add. MS 72,876, and see Pender, ed., A census of Ireland, circa 1659; Smyth, 'Society and settlement in seventeenth-century Ireland', p. 56. For examples of him drawing on hearth tax and excise returns, see B.L., Add. MS 72,865, fos. 33-41; B.L., Add. MS 72,866, fo. 140v; B.L., Add. MS 72,881, fos. 7-10; B.L., Add. MS 72,891, fos. 7-8.

¹⁶ For Petty's calculations of Irish population for 1652 and 1672, see Petty, Political anatomy of Ireland, pp. 6-7, 17; Royal Society (hereafter R.S.), Classified Papers, 1660-1740, vol. XVII, item 18; and for 1687, see B.L., Petty Papers, Add. MS, 72,866, fo. 118r. For Irish revenues in the 1680s, see B.L., Add. MS 72,882, fos. 105-6; B.L., Add. MS 72,886, fos. 59r-60v, 153v-154r; B.L., Add. MS 72,890, fos. 160-7. Cf. Barnard, 'Sir William Petty, his Irish estates and Irish population'; Cullen, 'Economic trends, 1660-91', in Moody, Martin and Byrne, eds., A new history of Ireland, pp. 388-9, 403-5.

¹⁷ Petty, Political anatomy of Ireland, p. 8; B.L., Petty Papers, Add. MS 72,880, fos. 19v-20r; R.S., Classified Papers, vol. XVII, item 18; cf. Stone, Some British empiricists, pp. 31-6.

¹⁸ Petty, Observations on the Dublin-bills of mortality, p. 1; idem, Further observations upon the Dublin-bills, p. 1.

¹⁹ Petty, Further observations upon the Dublin bills, pp. 2-4.

²⁰ This view became common among progressive thinkers during the Commonwealth: Pincus, 'Neither Machiavellian moment nor possessive individualism', pp. 717-24. For typical restatements of this position, see Fortrey, Englands interest and improvement, p. 9; Britannia languens, p. 176; Melish, 'The best way of England's improvent', R.S., Classified Papers, vol. X, item 16. On the strength of the Dutch economy in the mid seventeenth century, see de Vries, and van der Woude, The first modern economy.

²¹ Petty, Verbum sapienti, in Hull, ed., Economic writings, I, p. 105; B.L., Petty Papers, Add. MS 72,866, fos. 118r; B.L., Add. MS 72,885, fos. 120v. In 1685 Halley's calculation put the total landmass of England and Wales at 39,938,500 acres, while using a different method, Petty calculated 38,660,000: B.L., Add. MS 72,899, fos 163r, 164r. The modern figure is 37,340,338 acres. Another table of acreage, county by county, sent to Petty at about this time put the total at 37,664,348: B.L., Add. MS 72,890, fos. 22-3. On this table see Slack, 'Measuring the national wealth in seventeenth-century England', pp. 617-19, 631-2.

²² Petty, Political anatomy of Ireland, pp. 63-4.

²³ Petty, Verbum sapienti, in Hull, ed., Economic writings, I, p. 108; B.L., Petty Papers, Add. MS 72,886, fos. 21-2, 118r; cf. Lansdowne, ed., Petty Papers, I, pp. 181-2.

²⁴ Petty, Political anatomy of Ireland, pp. 21-2; B.L., Petty Papers, Add. MS, 72,885, fo. 120v. Elsewhere, however, he calculated 'the value of ye people' in 1687 at about £70 per head in England and about £50 per head in Ireland: B.L., Add. MS 72,886, fo. 148.

²⁵ Supple, Commercial crisis and change in England, ch. 9. See Southwell's criticism of Petty's ideas in Lansdowne, ed., Petty-Southwell correspondence, p. 146.

²⁶ Petty, Treatise of taxes and contributions (1662), in Hull, ed., Economic writings, I, pp. 34, 68; B.L., Petty Papers, Add. MS 72,880, fos. 19-22. The essence of these views was anticipated in the early 1620s by Mun, England's treasure by forraign trade, p. 13.

²⁷ Lansdowne, ed., Petty-Southwell correspondence, p. 153.

²⁸ B.L., Petty Papers, Add. MS 72,886, fos. 138-9.

²⁹ B.L., Petty Papers, Add. MS 72,866, fo. 142v; B.L., Add. MS 72,854, fo. 96v.

³⁰ B.L., Petty Papers, Add. MS 72, 881, fos. 21-2; B.L., Add. MS 72,884, fo. 33r; B.L., Add. MS 72,865, fo. 33v; B.L., Add. MS 72,854, fo. 97r.

³¹ Petty, Treatise of taxes and contributions, in Hull, ed., Economic writings, I, p. 36; B.L., Petty Papers, Add. MS 72,880, fo. 22; B.L., Add. MS 72,885, fo. 111r; Fitzmaurice, Life of Sir William Petty, pp. 322, 324.

³² B.L., Petty Papers, Add. MS 72,880, fos. 125r-33r; B.L., Add. MS 72,882, fos. 20, 55-8.

³³ B.L., Petty Papers, Add. MS 72,882, fos. 19-24; printed in Lansdowne, ed., Petty papers, I, pp. 59-63.

³⁴ Lansdowne, ed., Petty-Southwell correspondence, p. 281.

³⁵ Bottigheimer, English money and Irish land, pp. 141, 153; Corish, 'The Cromwellian regime, 1650-60', in Moody, Martin and Byrne, eds., A new history of Ireland, pp. 370-5.

³⁶ Lansdowne, ed., Petty papers, I, p. 89.

³⁷ Petty, Political anatomy of Ireland, pp. 79-80; R.S., Classified Papers, vol. XVII, item 18.

Petty's opinion of Irish housing as 'worse than the savage Americans', and view of the primitive condition of the Irish economy generally, may well have been adversely coloured by the particularly poor state of Kerry, with which he was most immediately familiar. See the report, 'Concerning Kerry', of Lord Herbert, John Butler and Cadogan Barnes to the Lord Lieutenant of Ireland, 27 May 1673, of which Petty had two copies: B.L., Petty Papers, Add. MS 72,854, fos. 10-13; B.L., Add. MS,72,855, fos. 37-9.

³⁸ Petty, Political anatomy of Ireland, p. 76.

³⁹ On the tendency to leisure preference among early modern workers, see Hatcher, 'Labour, leisure and economic thought before the nineteenth century'.

⁴⁰ Petty, Political arithmetick, in Hull, ed., Economic writings, I, p. 274; Petty, Verbum sapienti, in ibid, I, p. 110; Fitzmaurice, Life of Sir William Petty, p. 220.

⁴¹ Petty, A treatise on taxes and contributions, in Hull, ed., Economic writings, I, pp. 36-7; and cf. Petty, Political Anatomy of Ireland, pp. 82-3.

⁴² B.L., Petty Papers, Add. MS 72,866, fo. 54r; B.L., Add. MS 72,880, fos. 1r, 20r; B.L., Add. MS 72,886, fo. 147r, 150r; Petty, Political arithmetick, in Hull, ed., Economic writings, I, p. 290; Petty, Another essay on political arithmetick, in ibid, II, p. 473. Elsewhere he argued that Catholic holidays cost the Irish 35 of 300 days in a year worked by their Protestant contemporaries: R. S., Classified Papers, vol. XVII, item 18.

⁴³ Petty, History of the survey of Ireland, ed. Larcom, p. xiv; Petty, Another essay on political arithmetick, in Hull, ed., Economic writings, II, p. 473.

⁴⁴ Petty, Political anatomy of Ireland, pp. 94-5, 98-9; B.L., Petty Papers, Add. MS 72,879, fo. 89r; B.L., Add. MS 72,880, fos. 135, 146-7.

⁴⁵ Petty, Political arithmetick, in Hull, ed., Economic writings, I, p. 262-4. Cf. Tawney, Religion and the Rise of Capitalism, p. 206.

⁴⁶ B.L., Petty Papers, Add. MS 72,885, fos. 110r-111r; B.L., Add. MS 72,882, fo. 22; Lansdowne, ed., Petty papers, I, pp. 62-3.

⁴⁷ Lansdowne, ed., Petty papers, I, pp. 14-16.

⁴⁸ B.L., Petty Papers, Add. MS 72,866, fo. 176r; Lansdowne, ed., Petty papers, I, pp. 13-14; B.L., Add. MS 72,879, fos. 34-5, 64-8, 81; B.L., Add. MS 72,889, fos. 85r-86r.

⁴⁹ B.L., Petty Papers, Add. MS 72,879, fos. 112-13.