PIPE DREAMS AND TUNNEL VISIONS: ECONOMISTS AND AUSTRALIAN
POPULATION DEBATES BEFORE THE BABY BOOM

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Introduction

Australia is notably, if not notoriously, a land of much space but few people. Its population density is, correspondingly, almost the lowest of any country in the world: only Namibia and Mongolia record a lower figure. Australia's extreme divergence from the common human experience has been a magnet for strong reactions; and Australia's small population has frequently judged either being a failing or a blessing. Economists, however, have in the past two generations tended to keep their silence on this issue. But for about 20 years prior to the post-War baby boom economists did have some confidence that simple economic theory could constitute a guide to population policy, under the rubric of 'optimal population' theory. This paper reviews Australian explorations of 'optimal population' in the period, and concludes the episode provides a moral on the frustrations that may meet hopes that simple economic theory can provide answers to large questions.

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[1] I would like to thank Jonathan Pincus for his useful criticisms of an earlier draft. I am also indebted to the comments of Graeme Wells.

"This Tartarian Wilderness"

It is not entirely surprising that the earliest treatment of population issues in Australia was supplied by someone who never set foot on the continent, Edward Gibbon Wakefield (1796-1862). Although composed from within the walls of London's Newgate prison, Wakefield's 1829 *Letter from Sydney* vividly painted a picture of a recent and enterprising immigrant to New South Wales, who had been frustrated at every turn in his attempts to unlock the wealth latent in his estate. With not yet 70,000 inhabitants of New South Wales, the new arrival perceives Australia "would never be anything but a half-barbarous, Tartarian, ill-cultivated, poverty stricken wilderness, until in the course of nature, some hundreds of years hence, the population should become more dense" (Wakefield 1929 [1829] 19)

Thus Wakefield's *Letter* is a plea for numbers; but it is a plea for numbers made much more significant by his analysis of *how* greater numbers would benefit. In the *Letter* (and later efforts) Wakefield reveals himself as a genuine political economist; and one whose economic ideas received a respectful nod from J.S Mill. [2]

Wakefield had two themes. The first is the need for a larger population in order to drive wages down so as to generate a profit rate that will make investment worthwhile. To Wakefield the "evil attendant upon a scarcity of labourers" is "an extravagant rate of wages, which by giving to the labourer a very share of the produce, prevented the capitalist from accumulating' (Wakefield 1929 [1829]17)

Wakefield's second theme is a need for a change in structures of production if greater population is to yield the Smithian division of labour benefits that a greater population makes possible. Here Wakefield targets the impolicy of settling immigrants as if to foster an economy of peasant proprietors. As Mill supportively noted,

> *Mr. Wakefield was the first to point out that the mode of planting new settlements, then commonly practised—setting down a number of families side by side, each on its piece of land, all employing themselves in exactly the same manner,— can never be other than unfavourable to great production...* (Mill [1848], §3 Chapter VII)

What is needed for 'great production' is not subsistence households , but production structures that specialise and produce 'for surplus'. Mill (following Wakefield) also suggested that the specifically Smithian productivity gains realisable by a larger (and more specialised) production structures would be reinforced by the greater degree of 'co-operation' that a greater supply of

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[2] Wakefield's s father managed some financial affairs of David Ricardo.

labour would allow. Thus two men shifting large objects will (by co-operation) shift more than twice the mass that one man would shift.

Whatever the merits of Wakefield's case for specialized production structures, it needs little comment that Wakefield's hostility to increased population being realized in the form of 'yeoman landholding' was squarely opposed to the repeated and largely futile efforts at 'selection' ands 'closer settlement' by Australian governments from the 1860s (chapter 12 Shann 1930, Cameron 2005).[3]; But his stress on the 'cooperation' productivity benefits of an increased labour input certainly had repercussions on notions of an ideal population a century later.

1888 and all that

If Wakefield furnished some materials that could be deployed in the economic analysis of population growth, the Centenary of European settlement in 1888 provided the occasion of some ebullient forecasts of Australia's population growth over the next century. The circumstances, let us allow, were encouraging of ardent projections. Australia's population had increased over the preceding 10 years by a remarkable 84.6 percent (breaching the 3million mark in 1888), a decadal rate not remotely approached again.[4]

From London the *Spectator* declared "There is every reasonable probability that in 1988 Australia will be a Federal Republic, peopled by fifty millions English speaking men". A more sustained reverie was provided by Edward Pulsford (1844-1919), ardent free-trader, adversary of White Australia and 'one of the last survivors in Australia of the spirit of nineteenth-century liberalism' (*Australian Dictionary of Biography*). In '1888 annd 1988' an extensive article the *Daily Telegraph*'s 'Centennial Supplement' of 23 January 1888, Pulsford ventured Australia's population 1988 would be 60 million.[5] The basis of this growth would be development of the underdeveloped.

> *Whatever may be the condition of the purely tropical portion of Australia in 1988, we think we hazard little when we express the conviction that in that year the remainder of the continent will have been opened up and occupied , and that many blank spaces at*

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[3] How to ensure that increased population did not result merely in a more extensive collection of subsistence households? Wakefield's answer: sell Crown land at a price that was out of reach of the bulk of the population, leaving labour to either work as hired hands in surplus producing agricultural properties, or to seek work in towns and thereby promote the division of labour. The revenues from land sales would also pay for infrastructure in a way that would at least partly justify the high price. This fiscal manoeuvre was used in 19th c South Australia, and favoured by the Commonwealth Development and Migration Commission of 1928.   Otherwise Wakefield's received a mixed reception locally and only partial implementation (On both see Buckley 1957).

[4] The largest decadal rate of growth subsequently recorded was 55.0 percent, in 1958.

[5]' Pulsford adds, "The next Centennial must, however, have one sad record in the matter of population. The aboriginals of Australia will have been long extinct ... Poor fellows, it was not for their good that Cook 'discovered' Australia'".

present found on the map of Australia will before the next century be filled with the names of prosperous and populous towns

The upshot was no little confidence in the destiny of the small marginal society:

What notice could the fate of a handful of men at the other side of the world be expected to attract when the French Revolution with all its horrors transfixed mankind? Yet perhaps the coming centuries will regard the ultimate consequences of the foundation of these colonies as of greater importance than the French Revolution of 1789

Pulsford sets the template for enthusiastic visions that recurred over the next two generations.

Clearly these visions were entirely untroubled by the Malthusian bad fairy. This in some measure reflects that Henry George's *Wealth and Poverty* –in Australia a highly popular analysis of economic growth - was vehemently anti-Malthusian. Part of the recipe of George's influence that he straddled left and right by combining an animus towards inequality with a robust defence of the market. Thus George's greeting card to population growth cohered both with the 'liberal-left' of the day[6] and with the interest of business:

'The businessmen mostly took the Georgite line (divested of Georgite trimmings of course!) that Australia could support a much larger population than it was doing, and indeed, should encourage immigration to achieve this as quickly as possible' (Hicks 1978 p87)

The economic historian is reminded that, in Adam' Smith's reading, British policy in the 18th century for North America amounted to raising up a nation of customers in the New World for the benefit of British producers in the Old. In the same vein, from at least the late 19th Australian business has cordially welcomed the prospect of raising up an antipodean nation of customers for their own products.

The Gray 90s

The heady expectations of growth of the Centenary were not to survive the reverses of 1890s; Industrial dispute, banking crisis, drought and an economic contraction that was 'one of the most severe ever recorded' (Lightner, 1922). From 1891 the population growth rate sank each year; and in 1903 annual rate was only 1.1 %; the slowest annual rate since 1810. This was in significant measure due to slump in migration, but falling fertility also played a role. The crude birth rate had dropped from 35.5 in 1888 to 25.3 in 1903. This was first noted by TA Coghlan

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[6] An example of this Georgite reasoning is the 1890 critique in the *Westminster Review* of Malthusian theory by A. J. Ogilvy (1834–1914) founder in 1897 of the Democratic League, a forerunner of the Tasmanian Labor Party.

(1855–1926), Government Statistician of New South Wales, in his *Childbirth in New South Wales: a Study in Statistics*. He deemed that as a matter of 'public polity' "the decline in the birth rate is an extremely serious matter" (Coghlan 1900 25), and various other figures agreed. In the judgement of a later historian, 'By 1903 many prominent Australian feared that the decline was evidence of national decay comparable with that in France". (Hicks xv). Thus in the space of 15 years it seemed Australia's prospects had changed from leaving France in the dustbin of history, to joining her in the dustbin. A response was a New South Wales Royal Commission*, chaired by Charles Kinnaird Mackellar *(*1844-1926), an energetic public health reformer who dominated its proceedings 'in a manner uncharacteristic of his usually careful approach to scientific enquiry' (*Australian Dictionary of Biography*). The Royal Commission gave the first ventilation in Australia of 'natalist' policies.

The population anxiety of the new Commonwealth was aired also by George Handley Knibbs (1858–1929; knighted 1923) the inaugural Commonwealth Statistician,

> *The annual rate of increase in the Commonwealth population for the quinquenium 1901-1906 was practically identical with the annual rate of Germany, the figures being respectively 1.49pc and 1.47pc. In view of the sparsity of the population of Australia. the rate of increase equal only to that of such a densely populated country as Germany cannot be regarded as satisfactory* (Commonwealth Year Book 1911)

Knibbs' choice of Germany as comparator might not have been entirely innocent in these years of burgeoning international tension. Obviously Australia's population was not irrelevant to the consequences of those tensions. Visiting luminaries cautioned Australia on her vulnerability.

> *Lieutenant-Colonel Baden-Powell, replying at a reception extended to him at Hobart, uttered a warning with regard to the Yellow Peril. The Chief Scoutmaster said he had travelled through China and Japan, both of whom were looking for neighbours who had territories they could dispossess, and he was extremely, glad the Commonwealth was taking the course it was in, doing something to meet such an emergency,.*

> *Clarence and Richmond Examiner* Tuesday 11 June 1912

Boosters and Knockers

The agitated aftermath of the First World War was a time of 'brave new worlds'. Some countries had revolutions. Others adopted Temperance. The visionary creed that Australia seemed to embrace was 'development', and its manifesto was *Australia Unlimited* by Edwin J. Brady of 1918 (1869–1952), a one-time secretary of the Australia Socialist League, friend of Henry Lawson and publisher of Katherine Mansfield's first short stories. *Australia Unlimited*'s 1083

pages and copious photographs is prefaced by Dorothy Mackellar (the daughter C. K. Mackellar of the previously mentioned Royal Commission on fertility). Its credo is forthright.

> *We intend to utilize within the boundaries of our Commonwealth opportunities we have hitherto wasted or left underdeveloped. In this building up their will be opportunities for labour and capital unequalled in the histories of industrial civilisation ... It is the policy which is going to make Australia the richest and most powerful ... nation in the world* (Brady 1918 p.101)

Clearly the "rapid peopling of this great Continent" would be requisite for these ambitions. Brady did not seriously attempt a population target, but flags in passing 100 million (Brady 1918 p159), and urges that Western Australia acquire a population equal to that of England and France combined (Brady 1918 p.680)

Brady's tenet of a large population as a concomitant of development was repeatedly given a still more quixotic expression by the Prime Minister Billy Hughes

> *Increased population [said Hughes] was necessary for Australia, which was one of the most fertile countries in the world, and had an ample rainfall provided that it was conserved. He instanced Mildura and Renmark, which, he declared, were veritable paradises without angels and flaming swords. Mr. Hughes referred also to Burrinjuck, where, he asserted, a good living could be obtained from ten acres of land. He maintained that the Murray Valley was destined to equal the Nile in value of production*
>
> *The West Australian* 22 August 1921 p7

Hughes had no very steady estimate of the population Australia should seek. Sometimes he conjured with 25 million[7]; at others around 100 million.

> *[Hughes] did not hold with gloomy pessimists that because of geographical causes Australia would never be able to hold a big white population. He believed that some day it would hold a population nearly as big as that of like United States. [109million in 1921]*
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> *The Brisbane Courier* 23 September 1921 p7

The 1920s was certainly the period of 'heroic' estimates of Australia's potential population; thus Albrecht Penck (1858-1945) hydrologist at University of Berlin mooted 480m .

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[7] Australia," said Mr. Hughes, "is big enough for a population five times its present size. It wants more people". *Barrier Miner* 27 October 1920 p

These fancies were confronted by the gloomy geographer and weird genius Thomas Griffith Taylor (1880–1963), the foundation head of Australia's first university geography department, in Sydney. In a highly influential 1926 paper in the *Geographical Review* of the American Geographical Society, Griffith argued that Australia was sparsely populated for good reason.

> *The writer sees no reasonable hope of close settlement in most of empty Australia, for the sufficient reason that Nature has not endowed it with a suitable environment. No government can alter this fact ...* (1926),

Griffith records "no regions better deserve the title of desert than the vast uninhabited (and under present conditions, uninhabitable) areas *[of Australia]*" (1926). These facts, he allowed, 'were unpleasant. Sensible men and women, however, had to face them.... The nearest geographical parallel to inmost Australia was the Sahara desert.' He underlined this with numerous photographs of dismal 'gibber plains' (in implicit rebuttal of the cheerful plates of *Australia Unlimited*) and the observation that Australia's 'frontier' - defined 'one person per four square miles' - had been *retreating* towards the coast since 1900. The empty spaces were becoming emptier still.[8]

Neither could the uninhabitable emptiness be transformed by infrastructure investment; 'railways can do practically nothing to advance population in regions where the environment is not attractive', with the consequence that 'the £10,000,000 proposed to be spent on the building of the north-south [Alice Springs-Darwin] railway would be money wasted.... the money could be put to considerably better use in districts capable carrying larger population. (*The Sydney Morning Herald* 30 April 1926 p12) [9]

Griffith's stony rebuttal of populationist imaginings provoked considerable ire.

> *Sir, It was reported the other day that, prior to his departure for the United States of America, Professor Griffith Taylor made the astounding statement that Australia could not carry a population of more than 20,000,000 people! As Schiller says-"E'en the gods rebel in vain against such crass stupidity". If he said that this wonderful continent of ours could accommodate 200,000.000 he would have been saying something nearer the mark. Why, Queensland alone has room and opportunities for a population of, at least, 60,000,000 people If the learned professor talks in this wild fashion In America-well, Australia will not get much of an advertisement.*

> *I am, etc.,*

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[8] The emphasis on desert is accompanied by a disparagement of Tropical Australia: 'The oft-quoted success of almost all economic tropical plants in the Botanical Gardens at Darwin speaks of the care of the director rather than the capability of the Territory' (Griffith 1927 p274)
[9] £10m is $682m 2010 prices. In fact, the completion of the Alice Springs to Darwin railway in 2004 cost $1,300m. .

Cremorne. B. HODSON. (The Sydney Morning Herald, 6 November 1928 p8)

The controversy reached the United States, where Australia's consulate saw fit to rebut Taylor in the *New York Times*

> *"I desire to state that efforts of the Commonwealth and State governments in Australia are centred in a policy designed to exploit vast areas awaiting only the advent of settlers to turn virgin country into highly productive land… Australia enjoys generous rainfall, and it is only a question of locking the water for discreet distribution to our rich lands'* (quoted in Strange, p130)

Griffith did not actually repudiate hopes for the "fertile south east" of the continent. Perhaps in consequence his own views on the reasonable expectation of population Australia were mobile: sometimes he ventured 20 million (*Geographical Review)*, sometimes 30m (*The Argus* 23 April 1948 p1), other times 40m (*The Sydney Morning Herald* 30 April 1926 p12), and even, in his *Environment and Race*, 50 million plus (p334). For this last Taylor received censure from what would later be called environmentalists. Thus David Stead (1877 – 1957) 'marine biologist, a founder of, and during its early years the main driving force behind, the Wildlife Preservation Society of Australia' [Wikipedia] repudiated Taylor's upside' estimate: 'personally, find it hard to believe that Australia can support such a large population as, say 50 to 60 millions on anything like our present standard of living or comfort with food drawn from its known natural resources'. (*The Sydney Morning Herald* 7 November 1928 p10)

With few allies in Australia, Taylor gladly left Sydney University for a position in University of Chicago[10]. But Taylor's message was not forgotten and was pressed again in 1942 in *The Myth of Open Spaces*, by William Douglas Forsyth, then of the Department of Information. Forsyth dryly observes that 'in a hundred and fifty years of settlement less than 10 percent of the land in Australia has been thought worth purchasing' (Forysth 1942 p68). He stresses that attempt to secure population growth by rural settlement would press hard against the universal momentum to urbanization since the industrial revolution. But by this time the arguments for population had changed.

Optimum Population

In the wake of population conflicts of the 1920s the nascent Australian economics profession in sought to bring some economic analysis to bear on the issue.

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[10] See Strange and Bashir (2008), Powell (1993) for accounts of Taylor's confrontation with populationists.

On the question of population the 1929 official inquiry by four eminent economists into protectionism, *The Australian Tariff: an Economic Inquiry*, played Ricardo to Wakefield's Smithianism. The working model behind the *Inquiry*'s logic conceived of the Australian economy as composed of two sectors: an agricultural sector, where a diminishing marginal productivity of labour prevailed; and a manufacturing sector where a constant marginal productivity of labour prevailed (Figure 1, and Coleman, Cornish and Hagger 2006). This assumption implied a stylised history whereby with a small population Australia would be exclusively agricultural, and consequently any population increase would push down marginal and average productivity in agriculture, to the cost of living standards. In this stylised history population increases would press down until the marginal productivity of labour in agricultural was reduced to equality with the marginal productivity of labour in manufacturing, at which point a manufacturing sector would appear, and absorb all further population increases. The expansion manufacturing sector, then, would stave off further declines in marginal productivity. Nevertheless, the per capita income in the economy would <u>still</u> decrease with every increase in population, since the average productivity of labour in the ever expanding manufacturing is less than average productivity in the now stationary agricultural sector (see Figure 2). The upshot of this logic was that the *Inquiry* was tacit anti-populationist. But the *Inquiry* accepted as a parameter the impossibility of stopping population increases, let alone reversing it.

But a bolder sense of possibility might have thrown some doubt of the inevitability of diminishing average products in the face of a larger population. Suppose Australia's population could be transformed back to that of 1829: would it really be true that a population of 65,000 would provide Australians a higher living standard than 6.5 million? Was there, indeed, any evidence of a Ricardian pressure on living standards while Australia's population was growing 100 fold over the previous hundred years? Ricardian productivity effects, it would seem, must have been balanced by Smithian effects. That inference provided the context for the blooming of the concept of 'optimum population' in Australian policy debates in the inter-war years, a concept which turned on a contest between Smithian and Ricardian productivity effects

This concept of optimum population supposed there was some unique population level – the optimum - that would, in given circumstances, maximise any given country's output per head.

There were two founts to this notion: Knut Wicksell (1851-1926) and Edwin Cannan (1861-1935)

The notion of an optimum population had been first aired by the neoclassical economic theorist Wicksell, who, having thrown over the evangelical Christianity of his youth, had adopted birth control as his religion. This new faith raised an economic question that Malthusianism of classical economics could never ask. Under Malthusianism population was endogenous; so no matter what technical conditions prevailed population would adjust until per capita income was such that

net reproduction was zero. But if population could be controlled, then population could be a policy choice variable, and a 'best' population that made the most of per capita income could became a rational goal. Wicksell's work on optimal scale of the firm – the scale that was not wastefully small or wastefully large -- was clearly suggestive of an optimal scale of an economy, and therefore of its population.

But it was Edwin Cannan at the London School of Economics who had articulated the 1920s the most distinct rationale for the existence of a unique per capita income-maximising level of population; its existence reflected the operation within an economy of both diminishing and increasing returns.

As we have noticed, if returns were diminishing at all levels of population (the Ricardian effect), then income per head evidently would rise with every reduction in population; and the optimum would be indefinitely small. But if returns were increasing with every increase in population (Smithian effects) then clearly income per head would rise with every increase in population; and the optimum would be indefinitely large. But suppose at low levels of labour input, increases in labour reap productivity gains through making possible a Smithian 'division of labour' or 'specialisation'. Suppose also, however, that at higher levels of labour input these benefits of specialisation and co-operation will be counterweighed by the reduced productivity of labour (manifested in the burgeoning of Ricardian rents) that will be consequent upon the greater ratio labour to natural resources. Specifically suppose that returns were diminishing for low population, say below L .but increasing above L*. Then output per head is maximised at L*, the point where the elasticity of output to labour is unitary. L* is the optimal population (see Figure 2). Any population below L* we could call 'suboptimal', and any population above we might call 'supraoptimal'.

Benham

It was from Cannan's class rooms that there arrived in 1923 at Sydney University F.C. Benham, 'of those days … a self-confident, occasionally even brash, young man' (Butlin 1962, 386), who threw himself into Australian policy debates. In a chapter of *The Peopling of Australia* (1930) Benham ventured the first estimate of Australia's optimal population.

Benham explains that at low population levels 'a greater population will be able to take fuller advantage of economic co-operation per head' but at a sufficiently high population 'instead of new occupations being created [in response to more people], there would simply be more persons in each existing occupation', and the reduced 'natural resources per head' would dominate (Benham 1930a 254).[11] He moves forthwith from these *a priori* considerations to

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[11] Interesting, Benham also allows for a 'division of capital'.

declare 'I am inclined to think that optimal population [of Australia] is somewhere between 10 and 15m' (Benham 1930a p257). Regrettably, Benham gives barely any justification of this conjecture, beyond suggesting that, since between1901and 1913 productivity of labour rose by 30 percent, there could be no diminishing returns; a shaky inference that neglecting both technical progress and capital accumulation. Perhaps Benham felt the thinness of his case because his own *The Prosperity of Australia: An Economic Analysis*, (Benham 1930b) shies off any number; in considering the impact of greater population on 'division of labour' and reduced natural resources per head, he concludes 'it is impossible to say which of these tendencies would outweigh the other'.

In fact, in addition to empirical uncertainties, there are significant theoretical difficulties with the 'Benhamite' notion of optimal population.

Firstly, there is the embarrassment that at the Benhamite optimum all output is paid to labour.[12] Thus the Benhamite optimum inadvertently takes the appearance of the Wakefieldian workers' paradise and land owners' nightmare. The optimum is supremely optimal for labour, but pessimal for other factors. [13]

That the Benhamite optimum has wages share of 1 at the optimum raises a puzzle: in Wakefield's vision, was not the wholesale absorption of national income by labour a pathology of a sub-optimal population; a pathology that was to be relieved by the higher productivity that (Benham agrees) is secured by an optimal population? It appears we need to dig a bit deeper into the technology represented in Figure 3.

But one obvious rationalisation makes things still worse for the Benhamite optimum. Let the production relation of Figure 1 be rationalised as fundamentally one between the output per unit of natural resources ($Y/N = y$) and and factor *intensity*: labour per unit of natural resources,($L/N = l$), as in Figure 4.

$$y = y(l)$$

In this attempt to capture the Benhamite vision we are free suppose that the average productivity of labour rises with labour per unit of land until some critical intensity is reached; and above that critical intensity the average productivity of labour rises falls with labour per unit of land.

But under such an 'intensity' characterisation of Figure 3 there is, in fact, no unique 'optimal population'; under such a characterisation the maximum average product of labour can be

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[12] This property of the optimum is pointed out by Pitchford (1974): at the optimum the average product of labour equals the marginal product, which is what labour is paid in a competitive environment.

[13] Of course, one could imagine redistributions between factors so that the optimum actually improves all.

secured no matter how small the supply of labour. Proof: in Figure 4 the average product of labour is maximised at l*, as that provides the tangent ray from the origin. But l* can be secured no matter how small the total supply of labour less *simply by leaving some natural resources ('land') idle*. Thus all the productivity benefits that were supposedly dependent on a 'large' population are secured by a population no matter how small. After all, the marginal product of land at any intensity less than l* is negative, and consequently land will be left idle; left idle until the ratio of labour to cultivated land has risen to l*.[14] Thus for all L less than l*N, an increase in L would not cause an increase the labour intensity with which natural resources are worked; it would only reduce the amount of land left idle. The 'very march of the frontier' that excited populationists is revealed as no other than the market maintaining the productivity of labour at its maximum in the face of greater population. [15]

The Benhamite optimum might seek – and find - refuge in other rationalisations of Figure 3. Taking up Wicksellian themes against Cannanite ones, one may argue that the *intensity* rationalization of Figure 3 is mistaken; and that any increase in average productivity with population turns on the *scale* of inputs, rather than intensity. In this scale interpretation it will make all difference to the average productivity of labour whether 1 hr of labour is applied to 1 square metre of land; or a million hours are applied to a million square metres; despite the intensity being the same. And - to pursue the scale riposte to the intensity rationalization of Figure 1 - if 999,999 hours of labour input is withdrawn from cultivating the land then average productivity cannot be maintained by withdrawing 999,999 square metres of land from cultivation.

In mathematical terms, the scale interpretation of Figure 1 could be captured by

$$y = y(l)s(L)$$

$$s'(L) > 0 \text{ for } L \ll L_{artificial}.$$

$$y'(l) > 0 \text{ for all } l.$$

This will yield an average productivity of labour positively related to population for low levels of L, but a negative relation at higher levels; and so an optimal level of population.

There is, however also a difficulty in such 'scale' rationalisations of the optimum population: as long as positive scale effects are operative there can be no production equilibrium. As long as positive scale effects are operative, any enterprise can always increase its profit (or reduce its

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[14] $\frac{\partial Y}{\partial N} = y(l) - ly'.$ The right hand side is negative if $y'' > 0$

[15] We are simply registering the well known proposition that in the production relation depicted in Figure 4 we are always in the region in excess of l*. (See Stigler 1952, and Patinkin 1973, p792).

loss) by increasing scale.[16] Thus any enterprise always wants to get bigger: at least until scale economies are exhausted. Every enterprise to wishes to assume a scale that will exhaust scale economies.[17] Assuming scale economies are not exhausted by the Australian population – and even at the optimum population scale economies are *not* exhausted[18] – this means any single enterprise would like to assume a scale as la large (strictly speaking, larger) than the whole economy. Such a wish hardly seems to accord with reality.

An attempt could made to salvage the scale rationale for optimum population by invoking the existence of scale economies that are *external* to the firm; so that while all firms will experience scale effects as the economy grows, no single firm has the private incentive to try reap them by increasing their own scale. However, Tibor Scitovsky was probably little exaggerating in saying 'The concept of external economies is one of the most elusive in economic literature'(Scitovsky 1954, p.143). One might add that even if such economies can be identified - and Scitovsky judged examples 'not easy to find' –we are required to ask in a post-Coasian world why are these external economies not internalized? Again, answers to this query may be advanced, but the point is Benham's seemly apparent simple rationale for optimal population now ends up in a tangle of considerations regarding the force of 'Coase's Theorem'.

That both the scale and intensity rationalisatons advanced above of Figure 3 are problematic does not, of course, imply no successful rationalisation of optimum population exists. The point is simply that the Benhamite optimum eludes the simple rationalisation which its advocates assumed it had.

Smithies

Not long after Benham's effort, a different attempt at theoretical rationalisation of optimum population was provided Arthur Smithies in1938, on his return to Australia after completing a PhD under J.A. Schumpeter at Harvard (Smithies 1938).

Rather than analyse a single-good economy, Smithies considers a two sector economy, just as *The Australian Tariff* did implicitly. But whereas *The Australian Tariff* assumed constant marginal productivity in manufacturing, Smithies explores the implication of increasing marginal productivity in manufacturing, and demonstrates that alternative assumption destroys the anti-populationism of the *Inquiry* .

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[16]Factor prices could conceivably be so large as to make any non-zero production loss making. In which case there will be zero factor demand, which is hardly an equilibrium.

[17] Or it wishes to be of zero scale.

[18] Maximisation of average product entails $Ny(l)s' = Ny(l)\frac{s}{L} - y's$. Since the RHS is positive, s' must be> 0 at the optimum population.

Consider, said Smithies, an economy where one good ('boots) is produced under perpetually increasing marginal products, and a second good ('potatoes') produced under perpetually diminishing marginal products. It is clear that there is a welfare efficient allocation of labour between the two sectors, that can be usefully presented a diagram (Figure 5, not drawn by Smiithies) which plots the marginal utility product of potato labour and the marginal utility product of boots labour[19]

Figure 6 shows, critically, that an increase in population would increase the marginal utility product of labour in *both* sectors; and increase the average utility product of both sectors. However, further inspection of such figures reveals that increases population would not be indefinitely improving, as the marginal utility product of boots labour does ultimately diminish on account of the diminishing marginal utility of boots, (as manifested in the downward sloping portion of boots utility product of marginal labour). It is easy to see that a sufficiently large increase in population would bring that downward portion into play, with negative consequences. Thus the overall conclusion is that some extra population is improving, but not an unlimited increase: 'there is a magnitude of population which realises the maximum standard of consumption.'(Smithies 1938)[20]

Regrettably, Smithies rationalisation of an optimum population invokes theoretical problems that he is negligent in treating. To invoke increasing marginal products may create a unique optimum population, but increasing marginal products famously play mayhem with neoclassical distribution analysis. Certainly, it is impossible for labour to be paid its marginal product in manufacturing, and consequently the equimarginal product characterization of the allocation of labour in Figure 5 will not represent the market equilibrium. Again, an apparently simple economic rationale of an optimum population proves problematic. [21]

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[19] The marginal utility product of potato labour = marginal utility of potatoes * marginal potato product of labour

[20] Smithies sophisticates his analysis by allowing for international trade. If all boots were exported for an importable. there would be 'marginal utility product of boot export labour' that would bear the same general shape as boot marginal utility product of boots labour; but would bend down more sharply on account of a second downward pressure in addition to diminishing marginal utility: the terms of trade worsen as boot production is increased.

[21] The validity of his conclusion as a description of the welfare efficient optimum remains, but a population equal to the 'optimal population' would only yield if the allocation of labour between to the sectors was decided by a 'social planner'. A less 'material' theorisation of the benefits of larger population is also pursued by Smithies that amounts, curiously, to an early appeal to the benefits of 'multiculturalism' 'Cultural development' he suggests' depends on the absolute number of people engaged in its pursuit'. He then advances,

Conclusion

But however incomplete and theoretically beleaguered was the notion of optimum population, several Australian economists in the 1930s and War years felt they could show the existence of an optimum, and even quantify it. Thus the Queensland Bureau of Industry, under the direction of Colin Clarke, estimated Queensland's optimal population at 5million. The Bureau also deemed the optimum size of a Queensland city to be 200,000, perhaps surprisingly low.

In the post-War period, however, the attraction of concept of optimum population waned. Already by 1949 Peter Karmel, the economist most expert in demographic issues at the time, asserted that, 'with regard to the optimum population of Australia, it should frankly be stated that we have very little knowledge of what such a population should be' (Karmel 1949 p21). Perhaps Australia's rapid growth in population in the post-War took the wind out of estimates of the optimum, as population glided past the lower bound of Benham's '10-15 millions' in 1959, and the upper bound in 1981; and GDP per head continued to grow. Certainly, economists in the subsequent 50 years found little appeal in the concept.[22]Thus National Population Council in 1991, extensively shaped by economists, concluded 'It is inappropriate to enumerate an optimum population level or carrying capacity for Australia', and this was the view of the National Population Inquiry report of 1975.

A retrospective on attempts to understand the implications of Australian population growth is not impressive. We see analysts sometimes misled by current demographic tendencies – and blindsided by later demographic shifts; while other times casting *a priori* nets that become tangled in submerged complexities;

.

> *Certainly in literature .. the Middle West of the United States has given rise to the most significant movements since the War. The environment in which this literature grew was one of acute instability engendered by rapid economic development and violent racial admixture. It is the literature of feverish discontent. It is not suggested that it would be possible or desirable to reproduce the Middle West in Australia. But if migration is to take place on a large scale the immigrants will have to be drawn from non–British sources, and if they are to be absorbed their arrival must be accompanied by rapid economic development. Social instability may be anathema to Australians. We only wish to emphasise that the instability has compensations'*

[22] Pitchford appears to be the only post 1930s economist who explores it.

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Figure 1

The 'Brigden Report' Model

marginal value product in agriculture
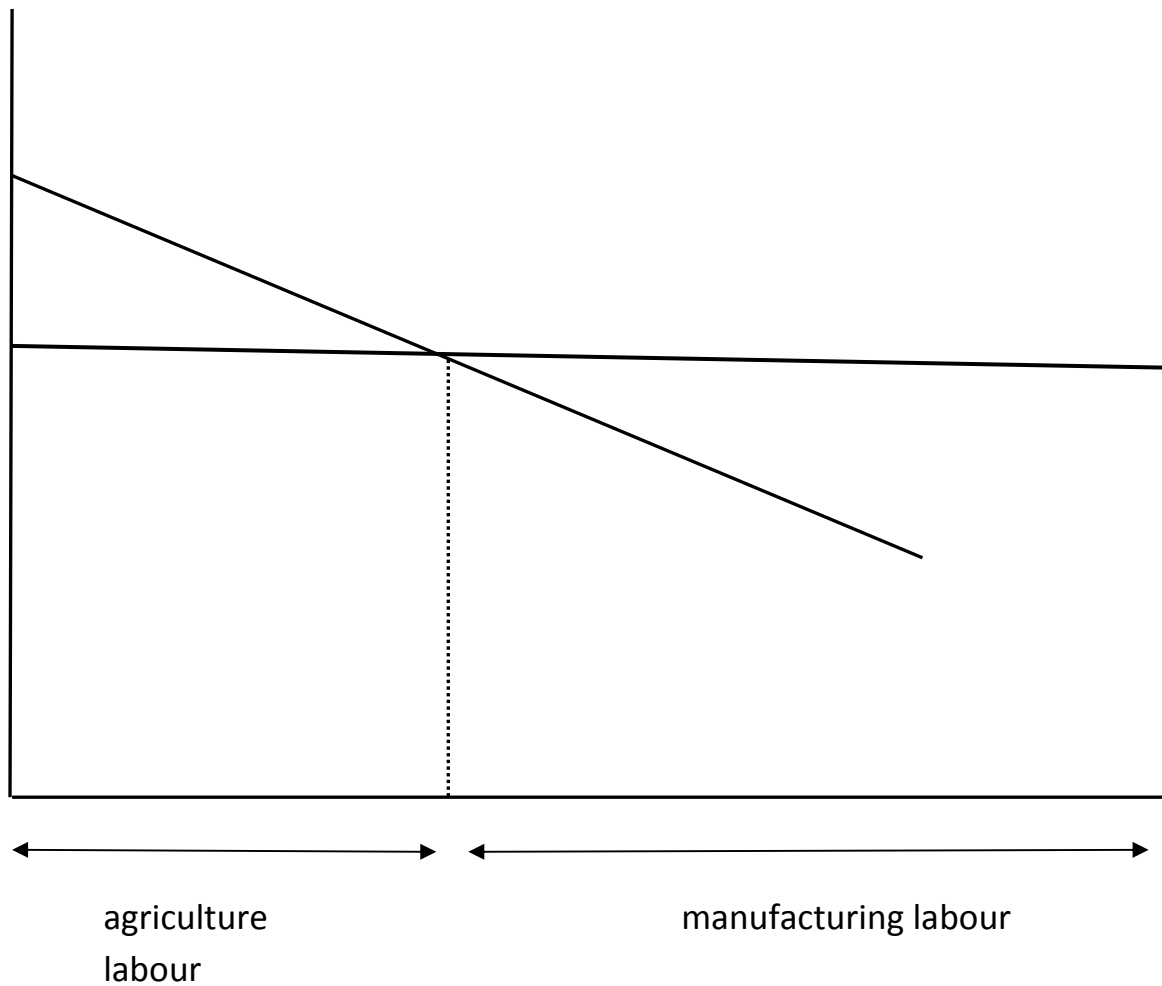
marginal value product in manufacturing

agriculture
labour

manufacturing labour

Figure 2

An Increase in Population in the Brigden Model

marginal value product in agriculture

marginal value product in manufacturing
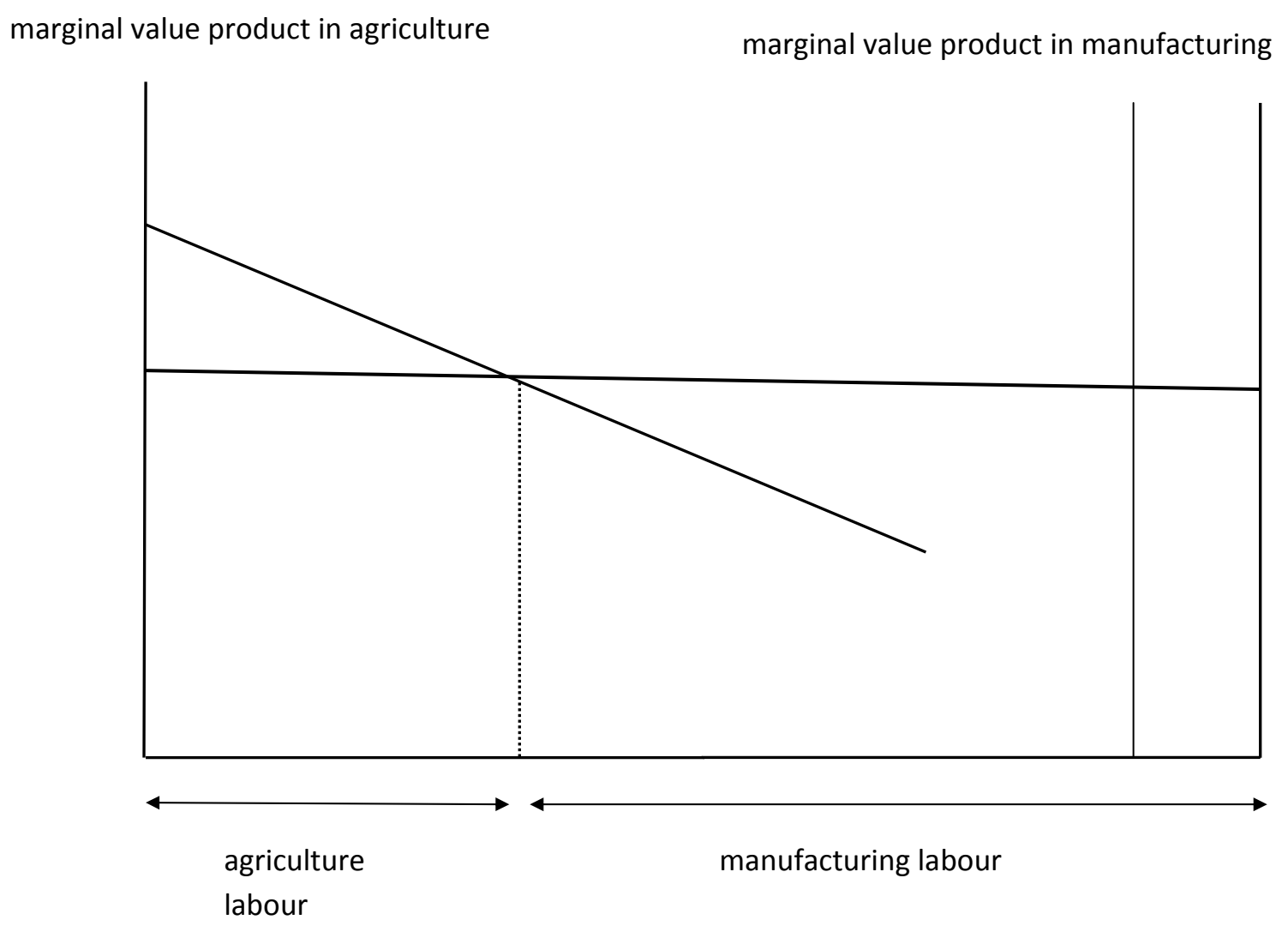
agriculture
labour

manufacturing labour
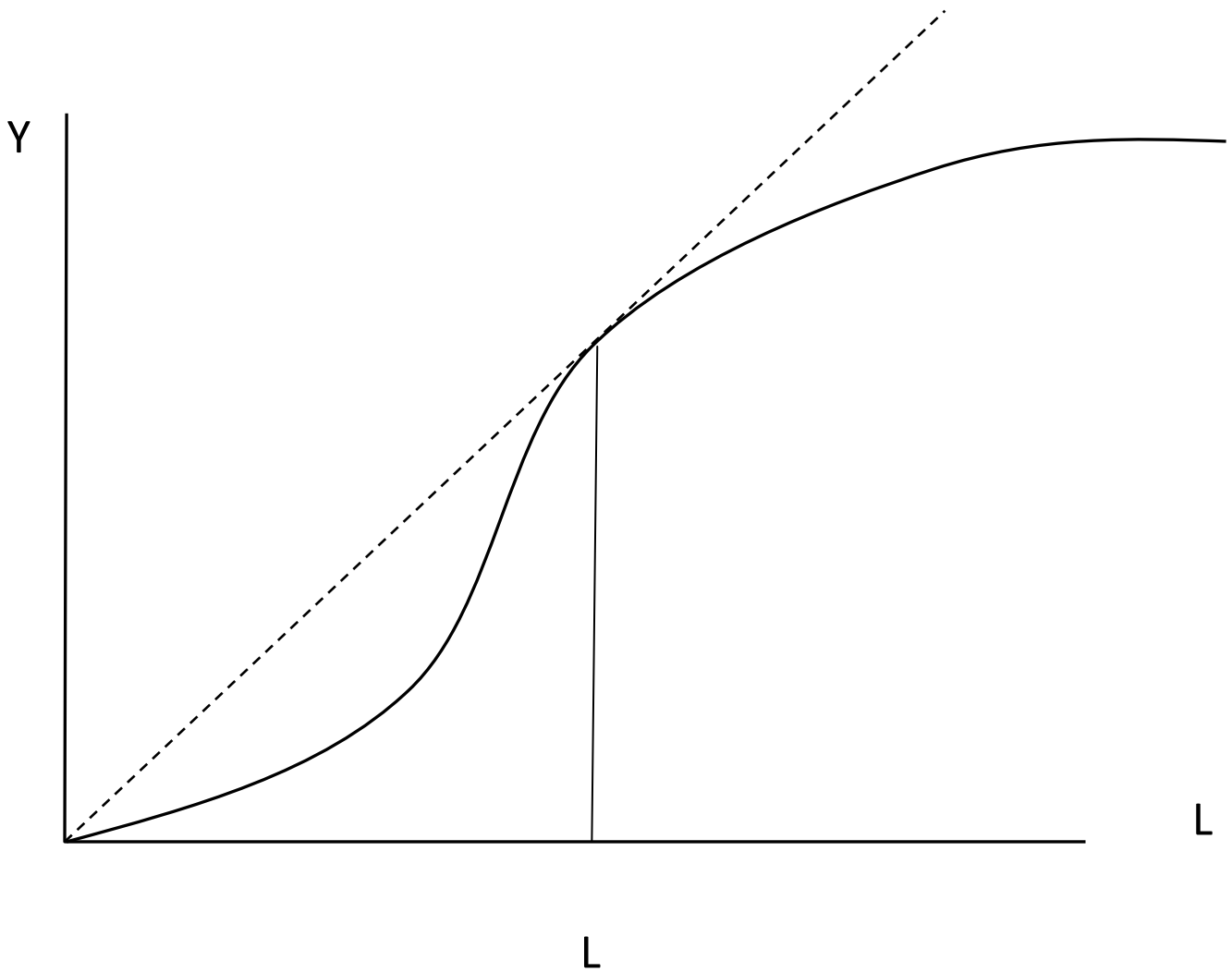
Figure 3

The Benhamite Optimum Population

Figure 4

Average Labour Productivity Maximised No Matter How Few People

Figure 5

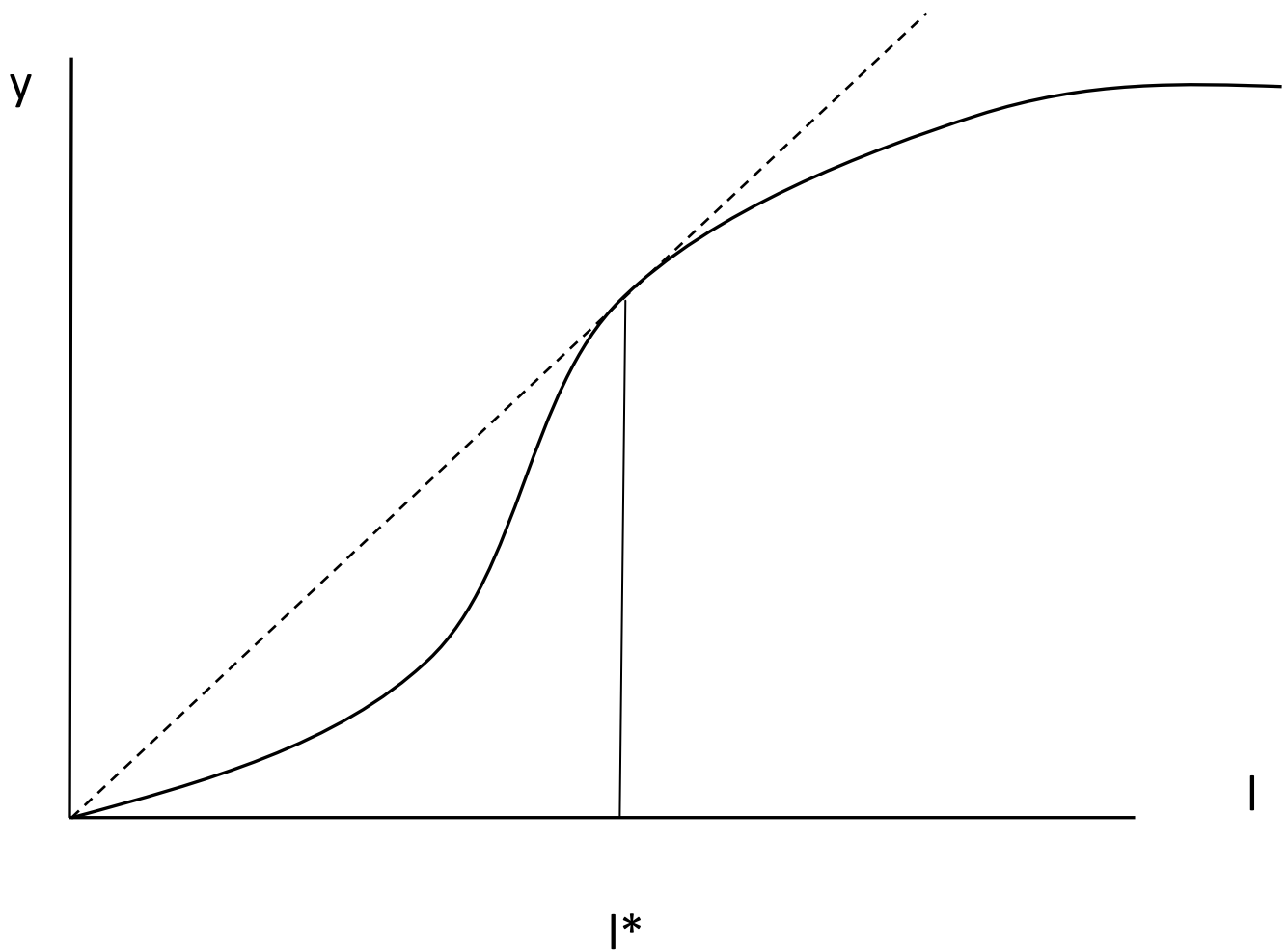## A Smithiesian Equilibrium

marginal utility product of potato labour

marginal utility product of boots labour

potato labour

boots labour

Figure 6

Everybody happier with more population

marginal utility product of potato labour   marginal utility product of boot labour

new equilibrium

old equilibrium

potato labour   boots labour