Full employment and ecological sustainability: comparing the NAIRU, Basic Income, and Job Guarantee approaches

Philip Lawn

School of Business Economics, Flinders University
GPO Box 2100, Adelaide, SA, 5001, Australia
Fax: 61 8 8201 5071 E-mail: phil.lawn@flinders.edu.au

Abstract: One of the central themes of this joint conference – *A Future that Works: Economics, Employment, and the Environment* – is how to achieve full employment and ecological sustainability. This paper assesses three alternative macroeconomic policy approaches in terms of how well they resolve these two policy objectives. The three approaches assessed are:

1. the NAIRU (non-accelerating inflation rate of unemployment) approach to macroeconomic policy setting
2. the Basic Income approach (guaranteed income for all)
3. the Job Guarantee approach (employer of last resort).

It is argued that:

- the NAIRU approach fails on both fronts
- the Basic Income approach has the potential to improve distributional equity – though not as effectively as the Job Guarantee – but does not ensure full employment or ecological sustainability
- the Job Guarantee is the best means of achieving full employment but, in order to bring about ecological sustainability, needs to be supplemented by the imposition of natural resource throughput constraints.

Keywords: full employment; ecological sustainability; macroeconomic policy.


Biographical notes: Philip Lawn is Senior Lecturer in Environmental and Ecological Economics at Flinders University. Over the past seven years, Lawn has written a number of papers on ecological economics issues and has recently edited a book entitled *Sustainable Development Indicators in Ecological Economics*. Philip is currently working on environmental macroeconomic models and a comprehensive set of indicators to assess Australia’s sustainable development performance.
1 Introduction

For some time now, a number of commentators have called for the growth of macroeconomic systems to be curtailed to achieve ecological sustainability (Meadows et al., 1972; Ehrlich et al., 1980; Goodland and Ledec, 1987; Ehrlich and Ehrlich, 1990; Daly, 1991; 1996; Gwydy, 1994; Lawn, 2000; 2003a). Moreover, because of alleged biophysical limits to growth, some of these commentators have argued that all but impoverished nations should commence a rapid transition towards a steady-state economy. A relatively new group of economists labelled ‘ecological economists’ also hold this view but believe there is a more pressing reason why nations should make this transition. They argue that an economic limit to growth precedes the biophysical limit and that macroeconomic systems should be stabilised at a physical scale much smaller than their maximum sustainable scale (Daly, 1996; Lawn, 2000; Max-Neef, 1995; Lawn and Sanders, 1999). Ecological economists have therefore called for an immediate cessation to the high-growth policies being widely adopted by most governments. Naturally, this demands that limitations be in some way, placed on real Gross Domestic Product (GDP).

The problem with non-increasing or declining real GDP is that under the institutional arrangements of most countries, a growth rate of around 2–3% is required to prevent unemployment from escalating. This raises the following question: “How can low rates of unemployment or, preferably, full employment be achieved in a low-growth or steady-state economy?” This paper will address this question in the context of three alternative macroeconomic policy approaches – namely: (1) the NAIRU (non-accelerating inflation rate of unemployment) approach to macroeconomic policy setting; (2) the Basic Income approach (guaranteed income for all); (3) the Job Guarantee approach (employer of last resort).

To answer the above question, the paper is structured as follows. First, it is explained what is in principle necessary to individually achieve full employment and ecological sustainability. Second, the NAIRU, Basic Income, and Job Guarantee approaches are explained and assessed in terms of how well they resolve the full employment and ecological sustainability objectives. Finally, by drawing on the strengths and weaknesses of these three macroeconomic policy approaches, a possible solution to the full employment/ecological sustainability dilemma is put forward.

2 What is necessary to achieve ecological sustainability and full employment?

2.1 Ecological sustainability

To achieve sustainability, it is necessary to maintain the stock of income or welfare-generating capital (Hicks, 1946). The stock of capital can be loosely split into the categories of natural and human-made capital. The former category includes the full range of renewable and nonrenewable resources, waste-absorbing sinks (e.g., wetlands), and life-supporting ecosystems. Human-made capital includes the stock of resource-transforming producer goods, such as plant, machinery, and equipment. For convenience, we might also include labour as part of the stock of human-made capital.
Natural and human-made capital are connected by an entropic flow of matter-energy that originates from natural capital in the form of low entropy matter-energy (resources).[^3] Through production, some of this matter-energy is temporarily ‘frozen’ in human-made capital, during which time it yields welfare-benefiting services.[^4] Following the consumption and wearing out of human-made capital, the matter-energy embodied within the stock returns to natural capital in the form of high entropy matter-energy (wastes). Given the obvious importance of natural capital in achieving ecological sustainability, one must ask the following questions:

- How much natural capital is required to ensure that the ecological sustainability objective is not recklessly put at risk?

- Should natural capital maintenance be a necessary sustainability tenet, what rules-of-thumb should human beings adhere to in order to prevent the wholesale decline in both the quantity and quality of natural capital stocks?

Despite agreement on the need to keep the stock of income-generating capital intact, debate has raged in relation to what form the capital should take. While some observers believe natural and human-made capital should be individually maintained (strong sustainability), others believe it is only necessary to maintain an appropriately combined stock of both forms of capital (weak sustainability). Which of these two approaches stands as the most appropriate form of action depends critically upon whether human-made capital and the technology embodied within it is able to serve as an adequate substitute for the source, sink, and life-support services provided by natural capital. Should it fail to do so, it is necessary to maintain the stock of natural capital intact as advocated by the strong sustainability proponents.

It is undeniably true that advances in the technology embodied in human-made capital can, for some time at least, reduce the resource flow required from natural capital to produce a given physical quantity of goods. However, for three related reasons, this does not amount to substitution (Lawn, 1999). First, technological progress only reduces the high entropy waste generated in the transformation of natural capital to human-made capital. It does not allow human-made capital to ‘take the place of’ natural capital. Second, because of the first and second laws of thermodynamics, there is a limit to how much production waste can be reduced by technological progress. This is because 100% production efficiency is physically impossible; there can never be 100% recycling of matter; and there is no way to recycle energy at all.[^5] Third, a value of one or more for the elasticity of substitution between human-made and natural capital is necessary to demonstrate the adequate long-run substitutability of the former for the latter. It has recently been shown that the value of the elasticity of substitution derived from a production function obeying the first and second laws of thermodynamics is always less than one (Lawn, 2003b). Thus, the production of a given quantity of human-made capital requires a minimum resource flow and, therefore, a minimum amount of resource-providing natural capital (Meadows et al., 1972; Daly, 1996; Pearce et al., 1989; Costanza et al., 1991; Folke et al., 1994; Lawn, 2003d). It is for this reason that some observers believe the strong sustainability approach to capital maintenance is necessary to achieve sustainability of the socio-economic process.
But before one can give a satisfactory answer to the first of the above questions, it is still necessary to consider what constitutes the minimum amount of natural capital that needs to be kept intact to ensure ecological sustainability. It is at this point that we must go beyond production possibilities and turn our attention to the life-support function of natural capital.

Deeper insight into the minimum required natural capital can be gained by considering what bestows natural capital with the unique capacity to support life. Is it the quantity of natural capital or is it some particular aspect of it? Lovelock leaves us in no doubt by emphasising that a minimum number and complexity of species are required to establish, develop, and maintain the earth’s biogeochemical clocks and essential feedback mechanisms. To wit:

“The presence of a sufficient array of living organisms on a planet is needed for the regulation of the environment. Where there is incomplete occupation, the ineluctable forces of physical or chemical evolution soon render it uninhabitable.” (Lovelock, 1988, p.63)

It is, therefore, a combination of the convoluted interactions and interdependencies between the various species, the diversity of species, and the complexity of ecological systems – in all, the biodiversity present in natural capital – that underpins its life-supporting function. That is not to say that the quantity of natural capital is unimportant. It is if only because the biodiversity needed to maintain the earth’s habitable status requires a full, not partial, occupation by living organisms. But the quantity of natural capital, itself, should never be equated with biodiversity.

If the sheer magnitude of natural capital is an inadequate indication of the effectiveness with which it can foreseeably support life, what is the minimum level of biodiversity needed to maintain the ecosphere’s life-support function? Unfortunately, this is not known, although, there is general agreement that some semblance of a biodiversity threshold does exist. What we do know about biodiversity is that in the same way that biodiversity begets greater biodiversity, so diminutions beget further diminutions. It is also known that the present rate of species extinction is far exceeding the rate of speciation – indeed, so much so that biodiversity has, on any relevant time scale, become a nonrenewable resource (Daily and Ehrlich, 1992). Given that a rise in the global rate of extinction will unquestionably increase the vulnerability of human beings to its own extinction, a sensible risk-averse strategy for humankind to adopt is a rigid adherence to a biodiversity ‘line in the sand’. Ehrlich (1993) provides a hint as to where this line should be drawn by pointing out that humankind knows enough about the value of biodiversity to operate on the principle that “all reductions in biodiversity should be avoided because of the potential threats to ecosystem functioning and its life-support role”. As a corollary of Ehrlich’s dictum, humankind should draw a line at the currently existing level of biodiversity. Conscious efforts should also be made to preserve remnant vegetation and important ecosystems. In all, a systematic decline in both a nation’s natural capital stocks and the biodiversity contained within should be viewed as a failure on the part of government policy to achieve ecological sustainability.

We are now in a position to answer the second of our above questions – that is, what sustainability precepts must we follow to prevent the decline in both the quantity and quality of natural capital stocks? While there are many possible precepts, the four fundamental rules-of-thumb requiring adherence are:
1. The rate of renewable resource extraction should not exceed the regeneration rate of renewable resource stocks.

2. The depletion of nonrenewable resources should be offset by using some of the depletion proceeds to cultivate renewable resource substitutes.

3. The rate of high entropy waste generation should not exceed the ecosphere's waste assimilative capacity.

4. Native vegetation and critical ecosystems must be preserved, rehabilitated, and/or restored. In addition, future exploitation of natural capital should be confined to areas already strongly modified by previous human activities.

Before we move on, there is a very important question that needs to be answered: Can we rely upon the market to ensure ecological sustainability or must we go outside the market domain and impose a throughput constraint on the macroeconomy? Ecological economists have successfully argued and demonstrated that market prices cannot be relied upon to satisfy the four sustainability precepts outlined above (Daly, 1991; 1996; Howarth and Norgaard, 1990; Norgaard, 1990; Bishop, 1993). Ecological economists base their belief on the fact that market prices only reflect relative scarcities — for example, the scarcity of one type of resource (oil) relative to another (coal). It is because market prices are very effective at reflecting relative scarcities that markets constitute an indispensable allocation mechanism. Unfortunately, market prices — and that includes prices manipulated via the imposition of Pigouvian taxes/subsidies or more clearly defined property rights — are unable to reflect the absolute scarcity of all resources (Lawn, 2004a). Yet sustainability is a question of the absolute scarcity of the non-substitutable low entropy matter-energy that sustains the economic process, not the relative scarcity of its constituent types.

To achieve sustainability, ecological economists believe that a government must establish a separate institutional mechanism based on ecological criteria in the same way that distributional equity requires a separate institutional mechanism based on ethical criteria (Daly, 1991; 1996; Lawn, 2000). According to ecological economists, this separate institutional mechanism should take the form of quantitative restrictions on the incoming resource flow. This, they argue, would ensure the resource flow is consistent with the regenerative and waste assimilative capacities of the natural environment.

One way of imposing throughput constraints without hindering efficiency is to have a government authority auction off a limited number of resource use permits. A limit on the number of permits institutes the required restriction on the incoming resource flow. Furthermore, because of the first law of thermodynamics, it also imposes a quantitative limit on the rate of waste generation. The premium paid for the permits by resource buyers serves as a throughput tax to facilitate the efficient allocation of the sustainable resource flow. It also encourages the development and implementation of resource-saving technological progress. As an added bonus, the revenue raised from the initial sale of the permits can be redistributed to the needy in order to narrow the gap between rich and poor. It can also be spent to reduce unemployment.
2.2 Full employment

Full employment is achieved when the macroeconomy generates enough hours of work to match the work preferences of the labour force (Mitchell and Mosler, 2001). In other words, full employment is obtained when the level of aggregate demand within the macroeconomy is sufficient to bring about a level of national income consistent with that needed to eliminate all but frictional unemployment. Clearly, structural unemployment exists if 'employed' people are working fewer hours than the amount desired at going real wage rates. Thus, full employment is not achieved if members of the labour force are underemployed.

The last aspect is important in the sense that the amount of hours a person is working does automatically determine if they are fully employed. For example, person X who is working 35 hours per week can be deemed underemployed if he or she prefers 45 hours at the going real wage rate, whereas person Y working 30 hours per week is fully employed if 30 hours matches his or her working preferences.

Should unemployment exist, full employment can, in principle, be achieved by increasing the level of aggregate demand so that real GDP rises to the full employment level of national income. I say 'in principle' because a government policy to boost aggregate demand has the potential to increase unemployment and/or result in ecological unsustainability. In the former case, it has been shown that an indiscriminate fiscal or monetary policy stance can lead to an undesirable dynamic characterised by periodic phases of demand-pull inflation and induced cost-push inflation at low rates of unemployment. This must be matched by a contractionary policy that, paradoxically, leads to high rates of unemployment (Cowling et al., 2003). It is the indiscriminate nature of a Basic Income and the more targeted approach to boosting aggregate demand via a Job Guarantee that has led some observers to believe that an 'employer of last resort' policy is far superior to the 'guaranteed income for all' approach (Cowling et al., 2003).

A reduction in unemployment can also be achieved by increasing labour productivity. Rising productivity increases real wages and real GDP per hour worked. Depending on the extent of opposing income and substitution effects, rising productivity allows workers to increase their well-being by working fewer hours. This facilitates job sharing and allows more workers — the majority of whom will be working fewer hours — to be engaged in the generation of a nation's real income. Policy measures to encourage productivity rises include tax incentives to promote efficiency-increasing technological progress and an industrial relations system that promotes harmonious workplace relations, horizontal decision-making structures, and incentive-based means of remuneration (Weitzman, 1984; Estrin, 1986; Blandy and Brummitt, 1990). Effective trade practices legislation that limits the abuse of market power in oligopolistic industries can also promote efficiency and advances in labour productivity.

Finally, unemployment can be reduced by inducing people to exit the labour force. Full employment is potentially achievable if the full employment level of national income can be lowered to exactly match the prevailing level of real GDP. Having said this, the very measures put in place to induce a labour supply withdrawal — such as stay-at-home allowances — can lower real GDP, particularly if the inducement is financed out of national income and is not matched by an offsetting form of non-market production (Lawn, 2004b). In this situation, the labour supply withdrawal is purely 'artificial'. Any
attempt to match the full employment level of income with what will essentially be a declining level of real GDP becomes a futile exercise akin to a cat chasing its own tail. The potential for a Basic Income to induce an artificial labour supply withdrawal forms the basis for some of the opposition towards it (Cowling et al., 2003; Tcherneva, 2003).

Given our definition of full employment, it is important to point out that the success of expansionary fiscal/monetary policies and productivity-enhancing measures requires the labour market to be suitably flexible to enable people to work their preferred number of hours. If a person exists on the backward-bending section of their labour supply curve and a rise in the real wage incites a potential 'down shifting' response, the capacity for job sharing to occur depends very much on the ability to negotiate a shorter working week with one's employer. Given the large number of people who appear to be overworking at a time when the level of unemployment and underemployment in Australia is still too high, it is fairly safe to say that the Australian labour market lacks genuine flexibility. Contrary to some opinions, the explosion of casual employment over the last 20 years cannot be regarded as evidence of an increasingly flexible labour market.

3 The NAIRU versus Basic Income versus Job Guarantee

It is now time to make an assessment of the NAIRU, Basic Income, and Job Guarantee approaches to macroeconomic policy in terms of how well they resolve the ecological sustainability and full employment objectives. Following a brief description of each approach, I will explain how and why they succeed or fail.

3.1 The NAIRU approach

The Non-Accelerating Inflation Rate of Unemployment (NAIRU) approach to macroeconomic policy is the currently preferred policy stance in most developed countries (Mitchell and Mosler, 2001; Mitchell and Muysken, 2002). It is predicated on two main factors. The first is the existence of an unemployment rate at which inflation remains steady – the so-called NAIRU. Should the unemployment rate fall below the NAIRU, it is argued that growing labour market pressure results in non-productivity-based wage rises. This, in turn, leads to an accelerating rate of inflation. Should the unemployment rate rise above the NAIRU, the opposite occurs (Norris, 1989).

Second, the NAIRU is premised on the view that macroeconomic performance depends very much on the extent to which a government is able to control the rate of price inflation. Should a government increase aggregate demand to reduce or eliminate unemployment, inflationary pressure builds up within the macroeconomy as the unemployment falls below the NAIRU and leads, ultimately, to an unemployment rate higher than the rate that existed prior to the demand stimulus. It has already been explained that an indiscriminate fiscal or monetary expansion can lead to an inflationary episode that must eventually be counteracted by a deflationary and, indeed, unemployment-increasing policy stance. There is, therefore, some truth in the importance in controlling inflation and the need to wisely undertake expansionary policies. But many question whether such a possibility, rather than probability, demands a macroeconomic obsession with inflation control (Blinder, 1987; Modigliani, 2000).
The unfortunate feature of a NAIRU or the 'inflation first' policy is obvious – its success relies on the existence of an unemployed pool of labour. In a very real sense, the well-being of a nation depends on the misfortune of a minority yet substantial number of 'sacrificed' citizens (Mitchell and Mosler, 2001; Blinder, 1987; Modigliani, 2000). NAIRU advocates respond by arguing that productivity increases, supply-side initiatives, and the lowering of inflationary expectations can reduce the NAIRU over time and attenuate the number of disadvantaged citizens. While evidence indicates some lowering of the NAIRU in Australia over the past decade, the NAIRU approach has been unsuccessful in bringing about full employment. Moreover, it is unlikely to do so unless full employment becomes an explicit macroeconomic policy objective. It simply does not generate the level of aggregate demand needed to eliminate all but frictional unemployment.

In terms of ecological sustainability, the NAIRU approach fails on two counts. In the first instance, there is nothing inherent in the NAIRU policy that amounts to a separate institutional mechanism to quantitatively restrict the incoming resource flow to the maximum sustainable rate. The NAIRU approach to sustainability relies entirely on the market and the government's willingness to manipulate resource prices and the penalty for polluting the environment. As already argued, this can facilitate increases in the efficiency of resource use as well as reduce the environmental pressure exerted by a given level of economic activity. However, it cannot ensure the aggregate level of economic activity and the resource flow required to fuel it remains within the regenerative and waste assimilative capacities of the natural environment.

Second, the NAIRU approach relies upon the growth of the macroeconomy (growth in real GDP) to maintain or lower the NAIRU/unemployment rate. So, apart from failing to impose the necessary throughput constraints, the NAIRU approach explicitly encourages the growth of the macroeconomy that increases the probability of any efficiency or productivity gains being overwhelmed by 'scale' effects.

One could, in response, achieve sustainability by introducing the above described resource use permit system. But this is only likely to worsen the unemployment problem associated with the NAIRU approach to the macroeconomic policy. One can therefore conclude that a NAIRU policy is incapable of satisfying the full employment and ecological sustainability objectives.

3.2 The Basic Income

A number of observers have long advocated a Basic Income to overcome the income insecurity associated with unemployment (Baetz, 1972; Van Parijs, 1991; 2000; Atkinson, 1995; Clark and Kavanagh, 1996). The Basic Income is usually proposed in the form of an unconditional and universal transfer payment financed by increased tax rates or a widening of the tax base. Set above the absolute poverty line, the Basic Income replaces existing forms of public assistance (e.g., unemployment benefits, disability allowances, and old-age pensions) (Clark and Kavanagh, 1996).

The aims of the Basic Income are many, but the primary objective is to ensure that each and every citizen is provided with a basic living wage irrespective of their contribution to society or their physical and mental capacity to make a contribution. By avoiding a link between the transfer payment and work, advocates of the Basic Income claim that individuals are afforded 'real freedom' – an absence of financial restraints on
behaviour and the means by which a person can realise their genuine aims and desires (Gintis, 1997). One of the other potential benefits of the Basic Income is that it can reduce people’s need, and/or incentive to work, and can thus precipitate a labour supply withdrawal. This, in turn, can reduce the full employment level of income, thereby limiting the need to undertake expansionary demand-side measures to reduce unemployment.

Critics of the Basic Income claim, first and foremost, that it does not guarantee full employment (Cowling et al., 2003; Sen, 1997; Saunders, 2002). Indeed, while the Basic Income provides a liveable wage for people who choose not to work, it does not guarantee work for those who still seek it. This is of great significance if employment itself serves a critical welfare function (Lawn, 2004b; Elster, 1988). Unfortunately, high unemployment is likely to persist because the Basic Income cannot, without the discipline of unemployment, attenuate emerging wage-price or price-price pressures (Cowling et al., 2003). Thus, like the NAIRU approach to inflation control, the Basic Income is non-inflationary only if there is a sufficiently large pool of unemployed labour.

Second, critics of the Basic Income point out that the level of national output required to support the Basic Income requires enough people to continue in paid forms of employment. In many ways, those who remain engaged in paid employment ‘pay’ for the non-work of those who exit the labour market. As such, the freedom from work exigency that the Basic Income affords one person becomes the source of another worker’s alienation (Cowling et al., 2003).

Third, the Basic Income constitutes an indiscriminate form of Keynesian expansion that leads, as earlier explained, to high rates of unemployment (Cowling et al., 2003,p.15). Finally, critics argue that the objective of the Basic Income to reduce unemployment is flawed because, apart from the potential problems outlined above, it encourages an artificial labour supply withdrawal (Cowling et al., 2003,p.8). Of course, the legitimacy of this criticism depends very much on what is meant by ‘artificial’. One can identify three main sources of a genuine or ‘real’ labour supply withdrawal. Two of these have already been outlined but are worth repeating. They include:

1. Increased labour market flexibility. Flexible labour markets enable people who would like to reduce their work hours, but presently cannot, to in fact do so.

2. Increased labour productivity. Improvements in labour productivity lead to higher real wages that allow people to reduce the number of hours they work.

3. Government cash payments to reflect the contribution that non-paid work makes to the social product (e.g., non-paid household work, child rearing, and volunteer work).

Why is the latter an example of a real labour supply withdrawal? Because the cash payment not only reflects the contribution one makes to a nation’s real income, thereby ensuring that any withdrawn labour is precisely matched by a real demand-side outcome, it overcomes the subsidisation by those who continue to work for the non-work of those who do not.

Of these three sources of genuine labour supply withdrawal, it is the latter that is most relevant to the Basic Income. To what extent the Basic Income induces a real or artificial labour supply withdrawal depends on how much the Basic Income exceeds the level of remuneration approximating the non-paid work contribution made by the average citizen towards the social product. I refer to the average citizen because it would be far too
complex to determine the exact non-paid work contribution made by each person and remunerate them accordingly. It is also administratively simpler to provide the Basic Income on a universal basis.

Clearly, a Basic Income set at the basic living wage – as most Basic Income proponents advocate – would far exceed the average person’s non-paid work contribution and precipitate a large artificial withdrawal of labour. However, a Basic Income set, for example, equal to the unemployment benefit paid in most developed countries (approximately 30–40% of the minimum wage) would be closer to the mark. Whilst a Basic Income of this sort would significantly and desirably reduce the number of people engaged in the labour market, it would induce little in the way of an artificial labour supply withdrawal, at least in terms of how it has been defined in this paper. Whatever potential exists for an artificial labour supply withdrawal would be minimised by making available a range of fractional job positions under the Job Guarantee programme that, over time, would compel the private sector to offer a similar range of fractional job opportunities. Nonetheless, it would by no means be sufficient to bring about full employment.

In terms of ecological sustainability, some would argue that a Basic Income can reduce environmental pressure by reducing the need for work and, therefore, the need to produce as much real output over time. However, since the limited unemployment-reducing success of the Basic Income depends on the actual payment reflecting one’s non-paid contribution to the social surplus, it is unlikely to have much of an impact on real GDP. If it were to lower real GDP substantially, it would almost certainly lead to a massive rise in the unemployment rate.

More importantly, and not unlike the NAIRU approach, the Basic Income fails to impose quantitative restrictions on the rate of resource throughput. It therefore cannot ensure that the incoming resource flow required to sustain the macroeconomy at its prevailing or growing physical scale is consistent with the regenerative and waste assimilative capacities of the natural environment. In all, the Basic Income is incapable of achieving both full employment and ecological sustainability.

3.3 The Job Guarantee

The Job Guarantee is a demand-side policy whereby the government acts as a buffer stock employer to continuously absorb unemployed labour displaced by the private sector (Mitchell and Watts, 1997). In other words, any person unable to secure employment in the private sector (or, indeed, conventional public sector) automatically receives a job under the Job Guarantee scheme. As part of the scheme, Job Guarantee employees are paid a minimum award wage to ensure they live decently. Importantly, the minimum wage paid to Job Guarantee employees establishes a wage floor for the entire economy. Spending by the government on the Job Guarantee increases (decreases) as jobs are lost (gained) in the private sector. In doing so, the Job Guarantee achieves ‘loose’ full employment. But does it ensure price stability? Certainly, by paying ‘buffer stock’ employees a minimum award wage, the Job Guarantee stifles the emergence of wage-related inflation (Tcherneva, 2003). But there is another source of cost-push inflationary pressure to consider. It comes in the form of rising low entropy resource prices as the economy approaches ecological limits.
Assume that the previously outlined resource use permit scheme has been introduced to achieve ecological sustainability. A recently devised IS-LM-EE model (Heyes, 2000) – *i.e.*, where an EE or ‘environmental equilibrium’ curve is incorporated into the standard IS-LM analysis – has shown that a fiscal expansion is likely to lead to higher prices as the excess demand for low entropy resources forces resource buyers to bid up the price of the limited number of resource use permits (Lawn, 2003c). This increases the real interest rate, crowds out private investment, and results in a lower equilibrium output level. We might therefore expect, in the short-run, for private sector employment to fall and the number of Job Guarantee employees to rise beyond the previous unemployment level.

The cost-push pressure exerted by higher resource prices also has some implications for Mitchell and Watts’ (2001) use of the Job Guarantee to control inflation. Mitchell and Watts have put forward an alternative inflation-control mechanism that they have referred to it as the NAIBER – the notion of a ‘non-accelerating inflation buffer employment ratio’. It works in the following manner. First, assume that a NAIBER policy is being employed and exists at a 6% unemployment rate. The Job Guarantee is now introduced to eliminate all but frictional unemployment. For argument’s sake, assume inflationary pressures now emerge. The government dampens private sector activity by, for example, increasing the corporate tax rate. A smaller percentage of the labour force will now be employed in the private sector while more will become Job Guarantee employees. Assuming an appropriate increase in the corporate tax rate, the ratio of Job Guarantee workers to private sector employees rises until the inflation rate is again stabilised. In other words, the NAIBER is achieved. Both inflation control and full employment are simultaneously resolved.

Given the above, the NAIBER is likely to be higher than the NAIRU in the short-run. For some observers, this will be undesirable. Many will see the role of the Job Guarantee as an employer-of-last-resort. They will also point out that an increasing number of people will be paid the lower Job Guarantee floor wage. This is undoubtedly true; however, consider the fact that, unlike unemployed labour, Job Guarantee workers will retain and acquire new and existing skills. This will achieve a number of objectives. First, it will maintain the productivity and self-esteem of the entire labour force. This will facilitate increases, over time, in the floor wage. Second, Job Guarantee workers will constitute a more credible threat to private sector employees than unemployed labour. Presumably the NAIBER will serve as a more effective inflation control mechanism than the NAIRU (Mitchell, 2000). Third, because the combined labour force will be more productive, the NAIBER is likely to be considerably lower than the NAIRU in the long run.

Of course, this all changes once the inflationary impact of higher resource prices emerges. Assuming the economy is operating at the ecological precipice – something that most economies already appear to have reached (Wackernagel *et al.*, 1999) – the introduction of the Job Guarantee pushes the economy beyond the sustainability threshold and, in doing so, increases the real interest rate, crowds out private investment, and results in a lower equilibrium output level. We might therefore expect, in the short run, private sector employment to fall even further and the number of Job Guarantee employees to rise beyond the previous NAIBER level. Consequently, what I would call an ‘ecologically sustainable non-accelerating inflation buffer employment ratio’ – the ESNIBER – is likely to be higher than the standard NAIBER in the short-run.
What about the long run? The much higher price for low entropy resources brought about by the introduction of tradeable resource use permits should induce a much greater rate of resource-saving technological progress. This will not only allow higher levels of real GDP to be obtained from the maximum sustainable rate of resource throughput, it should reduce any inflationary pressure that a Job Guarantee scheme might create. This, in turn, will keep interest rates low and encourage producers to adopt the best available 'green' technologies. Because of this, the ESNAIBER is likely to be lower than the NAIBER in the long run that, as already explained, should be lower than the NAIRU. There is likely to be fewer Job Guarantee employees under an ESNAIBER policy than unemployed people under a NAIRU policy – a desirable outcome in itself.

The aforementioned clearly shows that the Job Guarantee is an insufficient means to achieving ecological sustainability. This certainly should not be seen as a criticism of the Job Guarantee approach nor, given its capacity to attain full employment, a reason to reject it. Indeed, if much of the work conducted by Job Guarantee employees can be aimed at environmental rehabilitation and management, the scheme can play an important role in relieving some of the pressure that economic activity has on the natural environment (Cowling et al., 2003). But it cannot, by itself, deliver ecological sustainability. It must be supplemented by a separate institutional mechanism that quantitatively restricts the incoming resource flow to the maximum sustainable rate – such as the previously described resource use permit system.

4 A solution to the full employment/sustainability dilemma

A solution to the full employment/sustainability dilemma can be obtained by extracting the workable aspects from two of the three macroeconomic policy approaches assessed in this paper. Since the Job Guarantee approach is the only policy approach capable of achieving full employment, it should be given the consideration it richly deserves. But it should be supplemented by the following. First, as just explained, it should be complemented by a resource use permit scheme to:

- ensure ecological sustainability
- to facilitate resource-saving technological progress and a more efficient use of the incoming resource flow (that would now be sustainable).

It is worth pointing out a further positive aspect to emerge when the Job Guarantee is combined with a system of tradeable resource use permits. Should the introduction of the Job Guarantee increase the demand for resources, the higher price paid for resource use permits can serve to deflate the economy by the precise amount needed to bring about the ESNAIBER. There is no need to adjust tax rates, as in the NAIBER situation, since the resource use permit market fulfills this role as the demand for resource use permits fluctuates relative to their limited supply.

Second, a Basic Income should be introduced in the form of a negative income tax to reflect the non-paid work contribution made by the average citizen towards the social product. This would be set at something equivalent to 30–40% of the minimum wage. There are two reasons additional to those given in Section 3.2 for providing a Basic Income (negative income tax) at this level. In the first instance, Cowling et al. (2003) have argued that any policy initiative aimed at contributing to the full employment
objective must not violate social attitudes towards work and non-work. If the dominant social view is that no-one should receive 'something for nothing' (such as a Basic Income at the living wage), then it is utterly inconsistent for people to receive 'nothing for something'. The Basic Income, in the form proposed above, would go a long way towards the rightful receipt of 'something for something', even if it was, as I have recommended, administered in a very blunt and universal manner. Also, business concerns about the incentive effects of a Basic Income can also be alleviated if:

- The combined payment of the Basic Income plus a full-time Job Guarantee position equals what is generally considered to be the minimum income level.

- The Basic Income is deficit-financed.\textsuperscript{15}

This is because the minimum hourly Job Guarantee wage would be lower than the rate paid if the Job Guarantee existed alone (i.e., where 100% of a Job Guarantee employee's minimum income was derived from the Job Guarantee compared to approximately 30% and 70% respectively by a combined Basic Income and Job Guarantee). Assuming that the private sector can attract labour by paying an hourly wage for low-skilled jobs equal to that of a Job Guarantee job, the minimum hourly wage paid by the private sector would fall. In fact, a deficit-financed Basic Income (negative income tax) would serve as a private sector subsidy on the employment of labour, thereby assisting in the implementation of Ecological Tax Reform (ETR) (see Daly, 1996; Lawn, 2000).

Next, the failure of most governments to remunerate non-paid work distorts worker incentives. In stark contrast to fears that a Basic Income will induce an artificial withdrawal of labour, the non-payment of household and volunteer work has long induced an artificial influx of reluctant workers into conventional labour markets. Regrettably, this has placed enormous pressure on families and other critical institutions, norms, and customs. The Basic Income (negative income tax) proposed in this paper would correct this destructive labour market distortion. Of course, one would prefer to see traditional non-paid work remain unpaid on the basis that it constitutes an integral part of a nation's social capital (i.e., people undertake such work because they feel morally obligated to do so). But if market forces have the propensity to deplete social capital (Hirsch, 1976; Daly and Cobb, 1989) and its preservation and replenishment requires non-pecuniary assets to be valued in the same way as other assets, the case for a limited Basic Income is further enhanced.

Finally, since the Job Guarantee must ultimately meet the preferences of the labour force to be successful, a Job Guarantee programme should include a range of fractional jobs – all with the benefits and privileges associated with full-time employment (e.g., annual and sick-leave entitlements). Given that the average full-time job in most countries involves approximately 37.5 hours of work per week, or 7.5 hours daily, fractional positions should be established to allow individuals to work 7.5 hours (one day), 15.0 hours (two days), 22.5 hours (three days), 30.0 hours (four days), and 37.5 hours (five days) per week. Better still, a flexible Job Guarantee programme should include the possibility for people to work half-days (3.75 hours per day) for, say, a minimum of two half-days per week. Not unlike the disciplining effect of a minimum or floor wage, the flexibility of fractional employment would force the hand of the private sector to do likewise, thus helping to facilitate a 'standards-guaranteeing' form of labour market flexibility.
5 Conclusion

The immediate need for lower rates of growth and the eventual desirability of a steady-state economy places considerable constraints on the ability of policy makers to achieve both full employment and ecological sustainability. This paper has assessed three alternative macroeconomic policy approaches and shown that:

1. the NAIRU (non-accelerating inflation rate of unemployment) approach to macroeconomic policy setting fails on both fronts.

2. the Basic Income approach (guaranteed income for all) has the potential to improve distributional equity but is incapable of ensuring full employment and ecological sustainability.

3. the Job Guarantee can bring about full employment but cannot guarantee ecological sustainability.

In order to simultaneously achieve full employment and ecological sustainability, the Job Guarantee should be introduced and be supplemented by:

- the imposition of natural resource throughput constraints in the form of tradeable resource use permit schemes.

- a Basic Income (negative income tax) to reflect the non-paid work contribution made by the average citizen towards the social product.

The Job Guarantee programme should include a range of fractional jobs to meet the preferences of the labour force while the Basic Income can induce a real labour supply withdrawal and thus lower the full employment level of income. This, in turn, can reduce the number of Job Guarantee employees and lower the cost incurred by governments to finance the scheme.

References


Notes

1. A good example is Daly (1991).


3. To understand what is meant by low and high entropy matter-energy, the importance of the first and second laws of thermodynamics must be revealed. The first law of thermodynamics is the law of conservation of energy and matter. It declares that energy and matter can never be created or destroyed. The second law is the Entropy Law. It declares that whenever energy is used in physical transformation processes, the amount of usable or ‘available’ energy always declines. While the first law ensures the maintenance of a given quantity of energy and matter, the Entropy Law determines that which is usable. This is critical since, from a physical viewpoint, it is not the total quantity of matter-energy that is of primary concern, but the amount that exists in a readily available form. The best way to illustrate the relevance of these two laws is to provide a simple example. Consider a piece of coal. When it is burned, the matter-energy embodied within the coal is transformed into heat and ash. While the first law ensures the total amount of matter-energy in the heat and ashes equals that previously embodied in the piece of coal, the second law ensures the usable quantity of matter-energy does not. In other words, the dispersed heat and ashes can no longer be used in a way similar to the original piece of coal. To make matters worse, any attempt to reconcentrate the dispersed matter-energy, which requires the input of additional energy, results in more usable energy being expended than that reconcentrated. Hence, all physical transformation processes involve an irrevocable loss of available energy or what is sometimes referred to as a ‘net entropy deficit’. This enables one to understand the use of the term low entropy and to distinguish it from high entropy. Low entropy refers to a highly ordered physical structure embodying energy and matter in a readily available form, such as a piece of coal. Conversely, high entropy refers to a highly disordered and degraded physical structure embodying energy and matter that is, by itself, in an unusable or unavailable from, such as heat and ash. By definition, the matter-energy used in socio-economic processes can be considered low entropy resources whereas unusable by-products can be considered high entropy wastes.

4. Because 100% production efficiency is thermodynamically impossible, some of the low entropy matter-energy is immediately converted to high entropy waste.

5. The technical efficiency of production (E) can be written as the ratio of energy-matter embodied in physical goods (Q) to the energy-matter embodied in the low entropy resources used to produce them (R) — i.e., $E = Q/R$. While the value of $E$ can be reduced by technological progress, $E$ must be something less than a value of one.


7. Of course, the mere preservation or ‘locking up’ of large and small ecosystems will not, by itself, ensure biodiversity maintenance. Given the interdependent relationships between systems of all types, individual ecosystems are not entirely self-supporting (Lovelock, 1988). Their continued existence and the well-being of the biodiversity they contain is conditional upon the exchanges of both matter-energy with and between neighbouring and far distant systems. This applies to systems of all kinds, whether they be relatively pristine, moderately disturbed, or totally refined. Above all else, maintaining biodiversity requires the exploitation of natural capital to be conducted on the principle of respecting the holistic integrity of geographical land and water resource units.

The income and substitution effects determine whether a worker exists on the backward-bending section of their labour supply curve. If they do, a rise in the real wage rate causes the utility-maximising worker to reduce the number of hours they work.

NAIRU proponents go much further and argue that expansionary fiscal and monetary policies are almost always undesirable and should be avoided.

Virtually all people contribute to the social product by why of some form of non-paid work. Even ‘drop outs’ and people who would exit the labour market in the presence of a BI must engage in the generation of surplus value to survive or live comfortably. Note, also, that in so-called primitive societies, everyone had a crucial role to play and was not ‘paid’ for their work. They contributed to the social product and were then distributed their entitlement. While modern societies differ greatly, there remains some requirement on the part of each citizen to generate surplus value. The Basic Income, as I am proposing here, would merely acknowledge this contribution.

One of the other benefits of a Job Guarantee scheme is that allows a government to indirectly implement a progressive industrial relations policy. For example, a government could introduce post-industrial workplace practices (i.e., greater participatory democracy through the devolution of power in the workplace) that would give people the choice between a potentially demeaning but higher-paid job in the private sector or a self-actualising but lower-paid Job Guarantee job. In the same way the Job Guarantee wage acts as a disincentive for the private sector to pay very low wages, so the Job Guarantee scheme can act as a disincentive for the private sector to generate demeaning jobs and/or introduce draconian workplace practices.

Advocates of the Job Guarantee will point out that the outcome of a NAIRU policy – namely, a sacrificial pool of unemployed people – is far less desirable.


If the government’s aim is for the Basic Income to be budget-neutral, tax rates must be raised. To attract labour, the private sector would have to offer a higher pre-tax wage. If the tax rises are imposed on capital, the desire to invest will weaken. Neither would appease business interests and concerns.