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# PROGRAMME & ABSTRACT BOOK

Dwyer, M. C., & Miller, R. W. (1999). Using GIS to assess urban tree canopy benefits and surrounding greenspace distributions. Journal of Arboriculture, 25, 102-107.
Folke, C. (2006). Resilience: the emergence of a perspective for social–ecological systems analyses. Global environmental change, 16(3), 253-267.
Francis, R. A., & Chadwick, M. A. (2013). Urban ecosystems: understanding the human environment. London: Earthscan from Routledge
Gaston, K. J. (2010). Urbanisation. In K. J. Gaston (Ed.), Urban Ecology. Cambridge: Cambridge University Press.
GLA. (2011). The London Plan; Spatial Develoopment Strategy for Greater London.
Grimm, N. B., Foster, D., Groffman, P., Grove, J. M., Hopkinson, C. S., Nadelhoffer, K. J., . . . Peters, D. P. (2008). The changing landscape: ecosystem responses to urbanization and pollution across climatic and societal gradients. Frontiers in Ecology and the Environment, 6(5), 264-272.
Jim, C., & Chen, W. Y. (2009). Ecosystem services and valuation of urban forests in China. Cities, 26(4), 187-194.
Mahon, J. R., & Miller, R. W. (2003). Identifying High-Value Greenspace Prior'to Land Development. Journal of Arboriculture, 29(1), 25-33.
Niemelä, J., Saarela, S.-R., Söderman, T., Kopperoinen, L., Yli-Pelkonen, V., Väre, S., & Kotze, D. J. (2010). Using the ecosystem services approach for better planning and conservation of urban green spaces: a Finland case study. Biodiversity and Conservation, 19(11), 3225-3243.
Strohbach, M. W., Arnold, E., & Haase, D. (2012). The carbon footprint of urban green space—A life cycle approach. Landscape and urban planning, 104(2), 220-229. doi:http://dx.doi.org/10.1016/j.landurbplan.2011.10.013

## P20

## The potential role of an unconditional basic income in a sustainable and just economy

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1 Introduction

The existence of planet boundaries likely enforces degrowth of the current global economy in the future. Pursuing a human transition into the state with new economic constraints requires a redistribution of wealth to some degree. A minimum target should consist in enabling a living above the subsistence level for all humans. This is an ambitious aim which could be in contradiction with physical reality. However, humanistic reasons obligate to act in this way. A possibility to approach this goal is to introduce a basic income which guarantees consumption above the subsistence level. Essentially, three kinds of basic income could be conceivable. The first one is the unconditional basic income (UBI) which will be paid out to every member of the economy regardless whether he or she receives other incomes or has assets. The second one is the means-tested basic income. The economy member receives the basic income only if he or she has no other income of the same amount and has only assets below a certain tax exemption limit. The third possibility is to connect the means-tested basic income with an obligation to supply labor if demanded. The latter type of basic income is already installed in many economies of the industrial nations. Due to the high amount of wealth in industrial nations it is even conceivable to install an UBI above the subsistence level without risking a collapse of the economy. However, it is not clear if an UBI can be realized in less prosperous economies. An UBI that is not much smaller than the social product per capita could reduce the labor supply in a destabilizing way. The present study addresses with a simple model the limitations of the UBI in a probable future economy with reduced production.

2 Model

The possible impact of an UBI is studied within a simple static economic model. It divides the economy in the aggregates households, firms and state. The monetary cycle comprises sales pC, wages wN,

profits P, tax T and basic income B where p denotes the price, C the real consumption, w the wage rate and N the supplied labor volume. The model has some similarity with the static model by Green (1968) which describes the effect of negative income taxation. However, in the present model the UBI is transferred via a sales tax. Savings of households, investments in firms and issuing of loans are neglected so that the model rather represents the economy in the short term. Therefore, the following monetary budgets hold at equilibrium for households, firms and state

(1) $P+wN+B-pC=0$
(2) $pC-wN-P-T=0$
(3) $T-B=0$

Firms organize the production of goods and offer services. Both are summarized by the social product Y. The laborers supply the labor which is necessary to provide the social product Y which is simply related to the labor volume N by

a
(4) $Y=C' N$

where a denotes the output elasticity and C' the productivity. The labor volume has been scaled in such a way that N=1 represents the value where all labourers work at the maximum possible amount. Then, the social product just takes the value C'. Furthermore, Y=C holds since investments are neglected. The consumption in turn is divided into basic consumption Cmin covered by the UBI and the additional consumption Cplus so that

(5) $Y=C=Cmin+Cplus$
(6) $T=B=pCmin$

Households maximize their utility U in this simple model. It is a function of consumption C and labor N:

g
(7) $U=4[d(N-1)+1-N^2]/(2-d)^2\ C$

where d denotes the propensity to work and g the elasticity of utility with respect to consumption. The propensity to work is a parameter that determines the amount of labor where utility maximizes for a given consumption. The idea behind the introduction of this parameter is that people might see some benefit in providing a small amount of labor for free because labor may act as a mean to integrate into society. Utility maximizes at N=0, N=0.2 and N=0.4 for d=0,2 and d=0.6, respectively. Utility vanishes at N=1 due to the high work load that does not leave room for enjoying the consumer goods. Extremal utility results by taking the derivative of U with respect to labor N and setting it to zero. Assuming constant UBI, real wages, and real profits in the calculation is reasonable since households do not speculate that their individual preferences have any impact on macroeconomic quantities.
Wage, profit and price depend on consumption and labor. Assuming a mark-up q for the profit gives the relation

(8) $pCplus=wN(1+q)$

and by inserting the production function one obtains the real wage
a
(9) $w/p=(C'N - Cmin)/N/(1+q)$

Then, setting the derivative of U with respect to N to zero and substituting (8) and (9) leads to a polynomial equation.

The solution describes an economic equilibrium in which households have extremal utility. The equilibrium state depends on the ratio Cmin/C', the propensity to work d, the ratio g/(1+a) and the output elasticity a . The ratio Cmin/C' measures the real consumption based on UBI in relation to the maximum possible consumption. A high Cmin/C' is not necessarily associated with high minimum consumption since the economy can be underdeveloped. On the other hand, a low Cmin/C' can already guarantee living above the subsistence level in an economy with a high degree of economic development. The ratio g/(1+q) is a measure for marginal utility of consumption and it solely determines N in the case where Cmin=0 and d=0.

## 3 Results

The polynomial equation can only be solved with a numerical method but the result can be interpreted qualitatively. For d=0 the numerical analysis leads to a so-called Laffer curve (Laffer 2004). A Laffer curve has been displayed by Veen and van Parijs (1986) in the context of UBI (see their Fig. 1). This curve shows up in the diagram where Cmin is plotted against Cmin / C. The first is the real UBI while the latter variable can be seen as the nominal value of the UBI. With increasing Cmin / C, Cmin increases too but starts to decline beyond a critical Cmin / C value in the so-called “prohibitive range”. The decline happens because the curve displaying the social product C as a function of Cmin / C has a negative slope. Consequently, the introduction of an UBI has a degrowth effect and should for this reason be of interest in ecological economics. The highest Rawlsian social welfare results at the maximum Cmin. This maximum has also another meaning because the economy becomes unstable for higher Cmin /C values. The instability arises from a change of sign from negative to positive derivative of marginal utility. In the positive case the marginal utility increases (decreases) with increasing (decreasing) labor supplied which means that the utility function becomes a minimum in the “prohibitive range”. Consequently, the degrowth effect of UBI is limited and other measures are necessary to lower the consumption further if intended. The additional problem of a maximal Cmin below the subsistence level could arise in economies with low technical progress C'. With existing propensity to work (d=0) the maximum of Cmin attains a higher value that would lessen the latter problem. However, the social product is also larger at this maximum so that the degrowth effect is more limited. For a large d the UBI Cmin can even get higher than C. This would mean that people are willing to pay for providing work. However state seems unrealistic nowadays.

## 4 Discussion

The introduced simple model predicts a decline of aggregate consumption with an increasing UBI. Therefore, the introduction of an UBI would support degrowth. Furthermore, the inequality would decrease as productive society members would support less efficient ones by a redistribution tax. However, the approach has a limit beyond which the economy becomes unstable. The reason is that people who work claim an additional “gift”, namely Cplus. If Cmin comprises the most essential goods and services to live above the subsistence level, Cplus can be seen as superfluous from a radical ecological viewpoint. On the other hand, countries with low technical progress can possibly not offer an UBI above the subsistence level at all. An economy with an intermediate performance where the maximal Cmin is just above the subsistence level would result in a very small Cplus and would be optimal from an ecological-humanistic point of view. On the other hand, the UBI could be out of reach in poor countries. In this case a basic income could be combined with noncommercial obligatory labor that is exclusively devoted to the production of subsistence goods. Then, the market economy has a socialist core that can expand or shrink depending on the present economic state.

This study did not address inequality since the model only considers aggregated quantities. Yunker (2013) analysed the UBI in an equilibrium model that includes 20 heterogeneous households. He also found a decrease of aggregate consumption and detected a decrease of inequality. Possibly, additional insights can be gained by extending the model to multiple households and firms. Introducing an UBI can only be understood as a potentially useful additive for shaping a sustainable economic system.

Other measures that were not discussed here are necessary to overcome the inherent instability of financial capitalism (as e.g. mentioned by Minsky 1992).

References

Green C. 1968. Negative Taxes and Monetary Incentives to Work: The Static Theory. Journal of Human Resources, 3(3): 280-288.
Laffer A. 2004. The Laffer Curve: Past, Present, and Future. Heritage Foundation Backgrounder No. 1765.
Minsky HP. 1992. The financial instability hypothesis. The Jerome Levy Economics Institute Working Paper No. 74.
Van der Veen RJ, Van Parijs P. 1986. A Capitalist Road to Communism. Theory and Society, 15(5): 635-655.
Yunker JA. 2013. The Basic Income Guarantee: A General Equilibrium Evaluation. Basic Income Studies, 8(2): 203-233.

## P21

## CO2 emission profiles for mobility behavior in Austria

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Mobility is essential for high quality of life in modern times because it enables people to access labor markets, goods and services and enjoy recreational activities. However, transport is a major contributor to local and global environmental pollution. Hence, major efforts are required to achieve the EU climate goal of 80% CO2 emission reduction by 2050. The transport sector is of special interest in Austria because it is a major contributor to the nationally generated greenhouse gas emission with a share of a about one quarter of GHG generated in Austria. In addition, it has been reported that on average every fourth way in Austria is related to work. Hence the provision of sustainable mobility solutions is essential for prosperity and a low carbon society.
This paper aims to assess drivers of transport-related CO2 emissions based on a household survey and is driven by the following research questions: Which mobility-related CO2 emission patterns can be observed in Austria? To which extent are mobility-related CO2 emissions driven by household characteristics and structural factors? Our analysis is based on a representative (web-based) Austrian household survey (1449 observations) which has been conducted in February 2013 for the EU FP7 project DEFINE (Development of an Evaluation Framework for the Introduction of Electromobility). The survey provides information on typical mobility behavior such as trips to work, most often travelled trips and annual car usage.
We developed two indicators to assess CO2 emission profiles for Austrian households. The first indicator describes CO2 emissions for trips that are travelled most often and is based on the trip distance and energy intensity of the chosen transport mode. Means of transport include non-motorized transport modes such as walking and cycling, motorized private transport (car, motorcycle) as well as public transport (bus, train, underground and tram). The second indicator illustrates CO2 emissions for annual car usage based on annually driven kilometers and vehicle characteristics (e.g. fuel economy). Multivariate analyses permitted to test the effects of socioeconomic characteristics, behavior and preferences of households on CO2 emissions. In addition, another focus of analysis laid on the effect of agglomeration size on mobility and CO2 emission pattern. The understanding of both household-specific and structural factors as drivers of mobility is important in order to incentivize and transform the current transport system into a more environmentally friendly one.
Statistics of the survey indicate that the share of walking as main transport mode for a trip decreases sharply after the trip distance exceeds one kilometer. In addition, the use of underground and tram