A Growth Model with Social Welfare and Contemporaneous Externalities

Engelbert Stockhammer

University of Kingston

UK

Asjad Naqvi

Vienna University of Economics and Business

Austria

Economic growth and social well-being

- European Commission recently pushed for higher investment levels
  - Boost productivity and generate jobs
  - Social innovation and entrepreneurship: high quality of life, higher standard of living

- Does economic growth guarantee social well-being?
  - Is an optimal economic growth path socially desirable as well?

Growth and the environment

- Economic activity results in emissions
- Emissions accumulate in the environment
- Feedback on economic activity with some time delay
- Efforts have gone into modeling and predicting the ecological damage on the real economy
- Very little has been said on the negative well-being impact of emissions (contemporaneous externalities) in the economics literature
  - Some discussions in the ecological literature

Gaps in economic literature

- Neo-classicals discuss the role of supply as the long-run solution to growth problems
  - Factors of production are fully substitutable
  - Solutions to factor prices can give the environmental solution as well
- Keynesians highlight the importance of demand in determining growth
  - Ignore supply side constraints
  - Do not explicitly model ecological limits
- Impact of emissions is taken as an economic problem
  - Non-economic factors are not captured
  - Rising unemployment/inequality, bio-diversity loss, poor air quality

Fontana and Sawyer (2015)

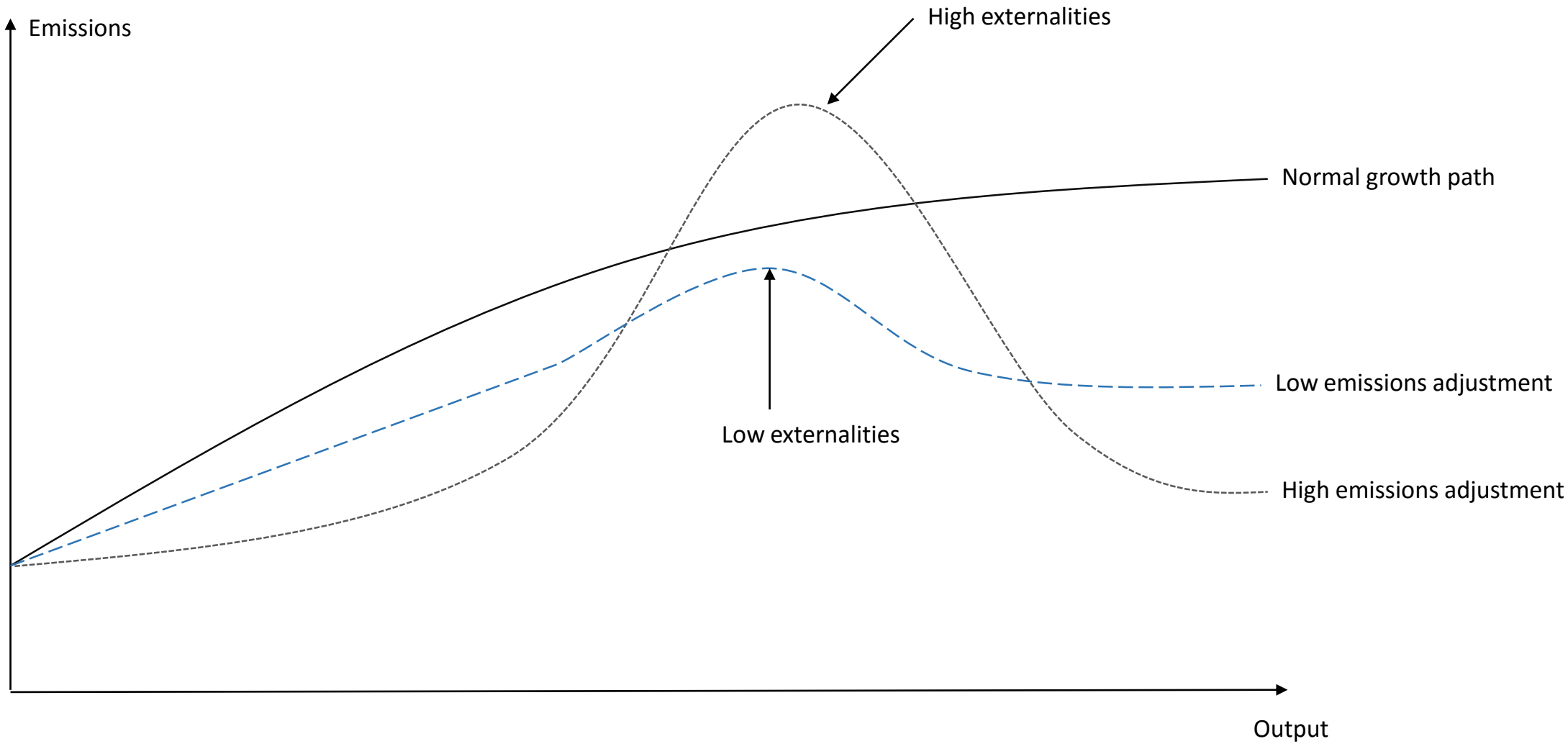
Identify three growth paths in PK literature with supply side constraints

- A demand-driven growth path determined by the interaction between investment and savings where the economy converges to a steady state $(\hat{g} = 0)$ (in spirit of Harrod-Domar)
- A full-employment growth path where output is high enough to ensure there is no unemployment $(g = n = 0)$ (in spirit of Solow)
- An ecological growth path where change in emissions is minimized $(\min \Delta E = 0)$ (in spirit of Ecological Economics literature)

Our contribution

- We add a fourth option:
  - A social welfare growth path where the welfare function is maximized $(\max W = 0)$
- We introduce well-being into a PK environmental growth model
- We bring insights from two EE debates within a PK growth model
  - Limits to growth/emissions
  - Social costs vs private costs
- We allow for two kinds of environmental effects
  - Emissions vs well-being
- We thus get a growth path for well-being that is distinct from warranted, natural, and environmental growth
  - Generates complicated time paths

Three scenarios



Growth scenarios

Scenario	Description
$g: I = S$	Warranted growth path
$g = \hat{Y} = 0$	No growth
$g = n$	Natural growth (Solow)
$g: \dot{E}_t = 0$	2 degree growth path
$g: Max\ W_t$	Socially desirable growth path

Next steps

- Define a social welfare function
  - Unemployment (-)
  - Change in emissions (-)
  - Level of emissions (-)
  - Change in output (+)
  - Change in income levels (+)

- Calculate the output, employment, emissions and social-welfare impact of each growth path
- Calculate the trade-offs and costs of achieving each of these growth paths
- Finding possible solutions to check whether some environment and welfare optimizing paths are achievable