Keynesian Growth and Instability

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Demand and Growth

- *Intrinsic* Keynesian model: demand generation process not automatic
- Long-term growth persistent, where does demand growth come from?
- Moments near full employment
- Mainstream growth models emphasize technology and resources: necessary but not sufficient

Rediscovering Harrod

- Baseline Keynesian growth model
  - Simple, one-sector model; linear saving and production
  - Investment targets expected capital-output ratio (utilization)
- Results:
  - Warranted rate – steady-state growth rate:
    - If it's expected, it actually prevails
  - But steady state unstable: knife edge
  - Unattractive as empirical prediction: economies don't seem to explode or implode
- Conclusion: basic Keynesian demand dynamics unstable, but that can't be the whole story
  - Need alternative structures to explain realistic growth paths

Vision of New Work

- Can Harrod's instability result explain persistent growth?
- Upward instability drives demand growth until resource constraints bind
  - Systematic demand growth not an "equilibrium" or "steady state" result
  - Moments of full employment
  - Link to Marc Lavoie point: full employment as a "fluke"
- Also need to contain downside instability
  - Hicks & Minsky: floors and ceilings

A Twist on Harrod's Theme

- Instead of "disappointment," instability is our friend
  - Source of persistent demand growth
  - Allows economy to exploit expanding production possibilities, at some points in time
- If resource constraints bind; follow "potential" path
- But potential path is not stable
  - Negative shocks send system to "floor" again, until unstable positive growth restored

Basic Model

- Demand drives output

$$Y_t = \min (AD_t , Y^*_t); \quad AD_t = C_t + I_t$$

- Linear consumption: $C_t = (1-s)\, EY_t = (1-s)(1+Eg_t)Y_{t-1}$
- Investment targets adjustment to desired capital

$$K^*_{t+1} = v^*\, EY_{t+1} = v^*(1 + Eg_t)^2\, Y_{t-1}$$

$$I_t = v^*(1 + Eg_t)^2\, Y_{t-1} - (1-\delta)K_t$$

Basic Growth Dynamics

- Law of motion for growth rate, conditional on expectations and lagged utilization of capital

$$1+g_t = v^*(1 + Eg_t)^2 - (1-\delta)(K_t / Y_{t-1}) + (1-s)(1+Eg_t)$$

- Note typical Keynesian features: rising demand components stimulate growth
- Warranted rate:

Set $g_t = Eg_t = g^*$; set $v_t = v^*$ => $g^* = (s / v^*) - \delta$

Basics of Instability

- At $\mathbf{Eg_t = g^*}$:

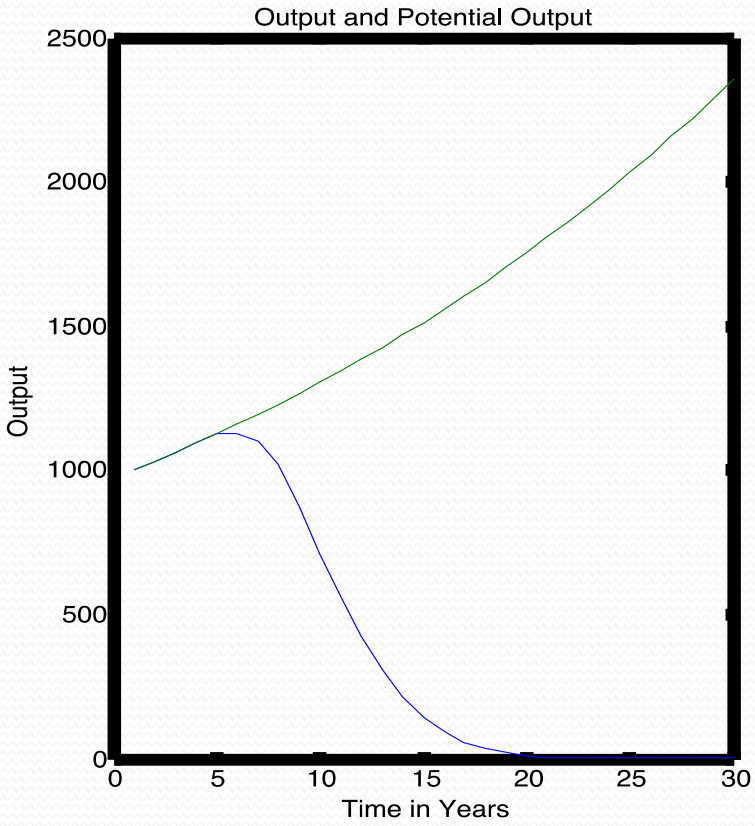
  (1) $dg_t / d(Eg_t) = 1+s+ 2v^*(1 – \delta) > 1$

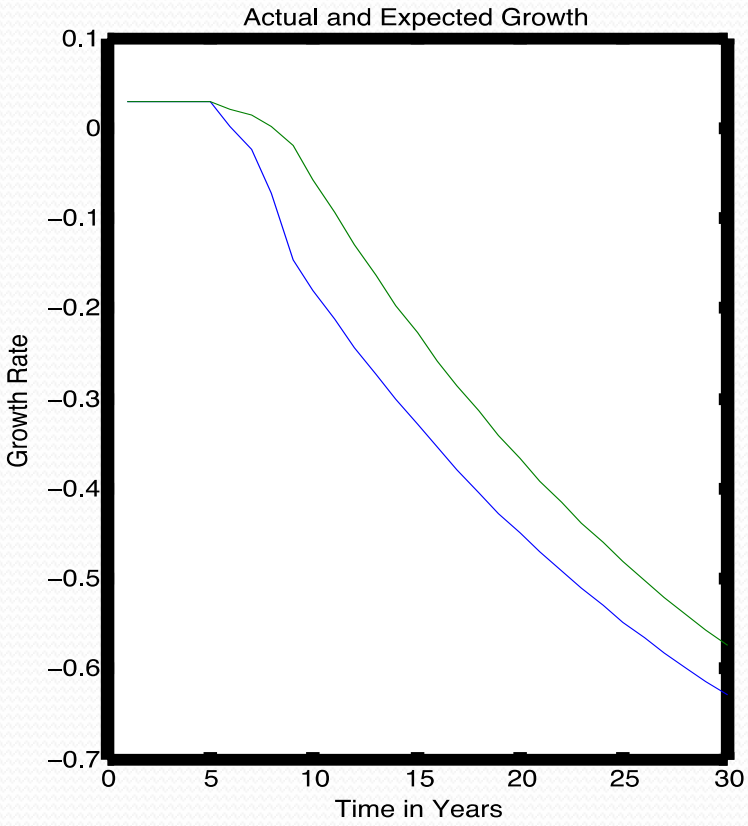
- Any deviation of $\mathbf{Eg_t}$ from $\mathbf{g^*}$ is magnified for any value of basic parameters
- Behavioral restriction:

  (2) $g_t < Eg_t \Rightarrow Eg_{t+1} < Eg_t$ (and reverse)

- Learning: instability reinforces expectation rule; moves expectation in direction of most recent error.
  - Behavioral expectations: contrast with RE
- Conditions (1) and (2) => instability; does not depend on parameter values

A Harrod Collapse





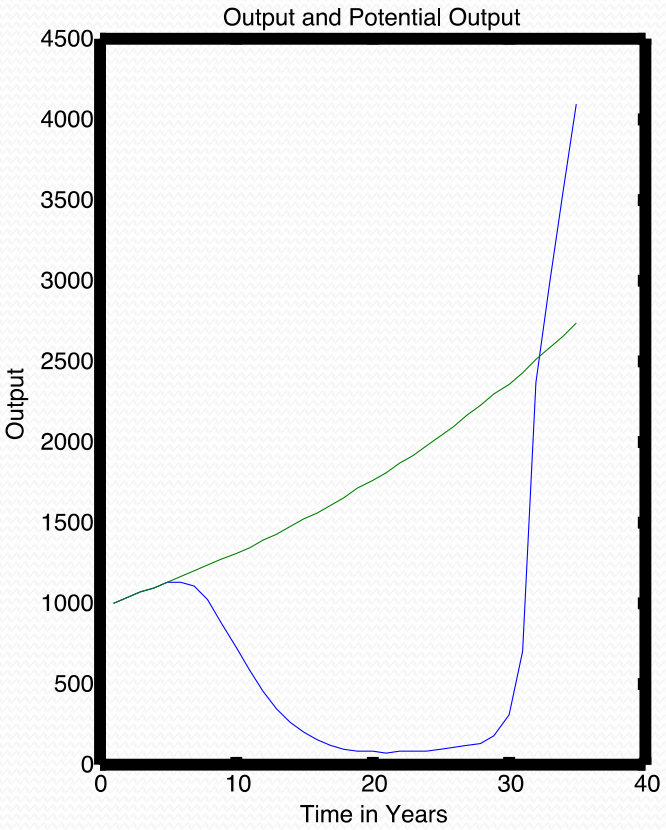
Containing Downside Instability

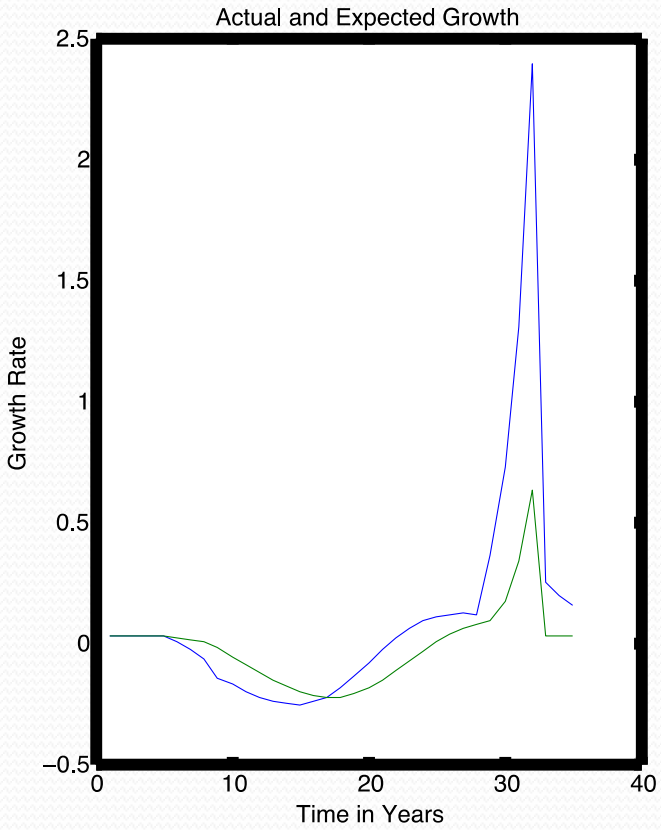
- Autonomous source of demand

  $F_t = F_0 (1 + g^A)^t$

- Stabilizes demand on downside. Key variable F_t / Y_{t-1} in law of motion
  - F_t / Y_{t-1} gets "large" as growth of Y_t falls below g^A
- Find Y' at minimum of cycle
  - Set **Eg** to zero and **v=v***: standard Keynesian multiplier
  - **Y' = F / [s – δv*]**
  - Denominator: propensity to save less "accelerator"

The “Floor” (f* = 0.01; tiny)





Interpreting the “Floor”

- Find Y’ at minimum of cycle
- Set **Eg** to zero and **v=v***: get standard Keynesian multiplier result
  - $\mathbf{Y_t' = F_t / [\ s - \delta v^*]}$ (time dependent path)
  - Denominator: propensity to save less “accelerator”

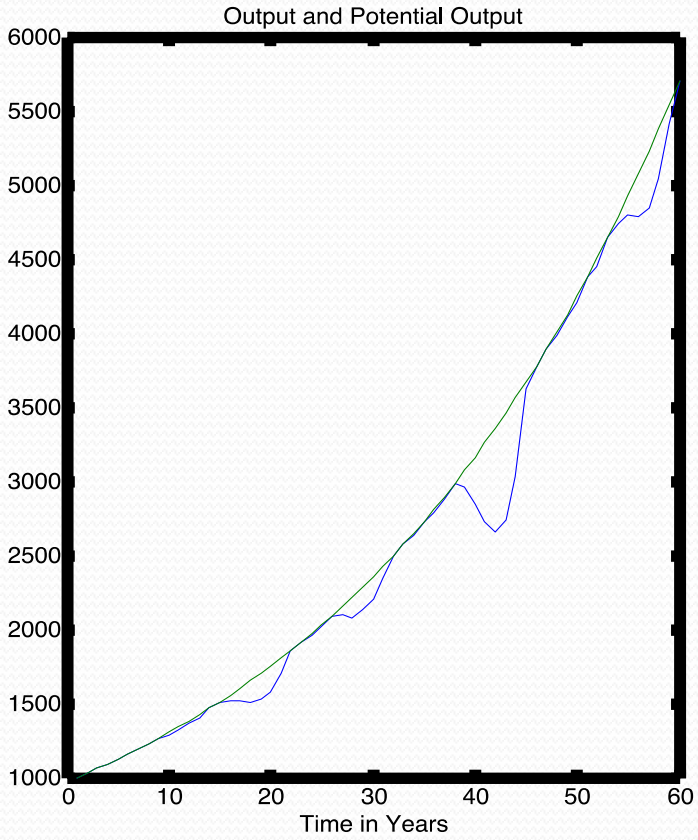
Labor Constraints and the Ceiling

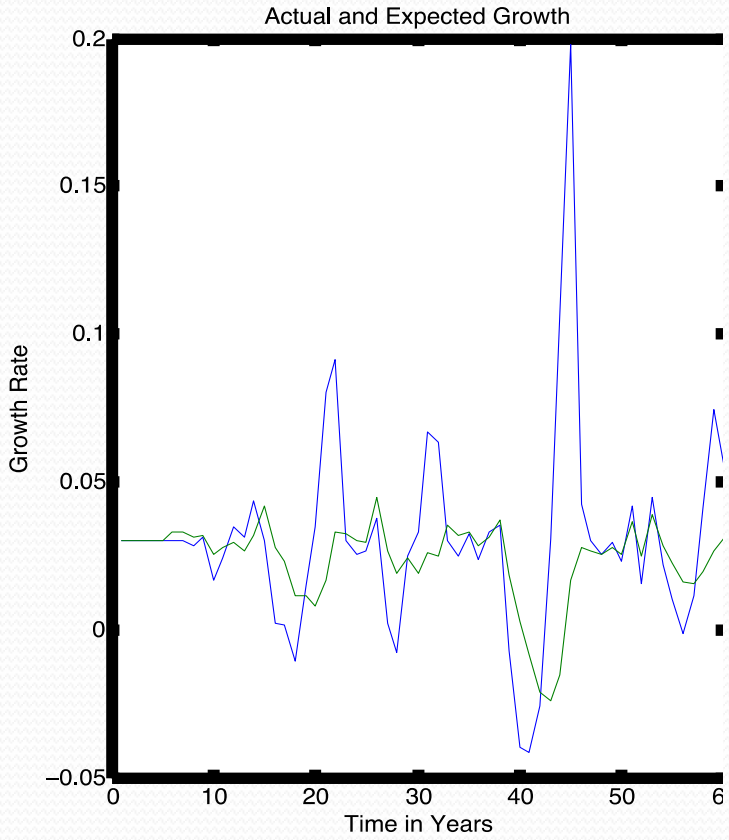
- Effective labor supply (productivity adjusted) grows exogenously at rate **g*** (simplest case); generates potential output **Y***
- If $\mathbf{AD_t > Y^*}$, $\mathbf{Y_t = Y^*}$
- Demand drives growth until system hits resource constraints

More Realistic Application

- Autonomous demand share 35%; limits downside volatility
- Capital-output ratio of 1.0 (2009 about 1.2)
- Random, uncorrelated shocks with standard deviation of 0.5%
- Growth path contained in corridor

One Realization (Random Shocks, f share 35%)





What is Important Here?

- No price adjustment / monetary policy mechanism to close "demand gap"
- Demand growth is the result of positive instability plus floor imposed by autonomous demand
- Simulations occasionally touch supply-constrained steady state, but Y* path is typically unstable
- Demand is proximate constraint on output most of the time

Variation in Growth of F

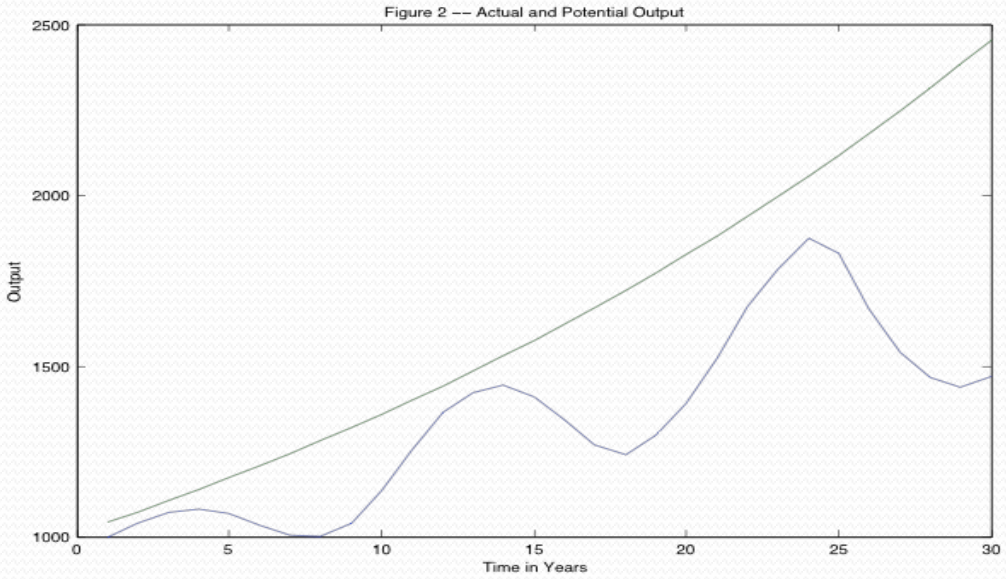
- No need for F to grow at same rate as potential Y
- Below growth of supply => corridor widens
- Faster than supply => corridor goes to zero
  - Seems unrealistic: fluctuations do not seem to disappear
  - Autonomous spending rises faster than potential output

Possible Stable Steady-State with F

- Presence of F always bounds demand/output path away from zero; creates "floor"
- May create endogenous ceiling on demand
- In this case, growth path driven by autonomous demand + basic multiplier
- Explanation for stagnation in "growth phase" of cycle
  - In unstable model, positive growth accelerates until resource constraints bind
- Empirical relevance of two regimes; what leads to switch?
- Important implications for fiscal policy (current project)
  - Need F to grow at rate that maintains full employment
  - Austerity affects levels and growth rate

Effect of Large “F”

- Constrains demand path away from potential output



Extensions

- Price and interest rate adjustment
  - Prices probably not too interesting
  - Interest rates and saving / investment; monetary policy
- Endogenous productivity: from demand to supply
- Finance: Minsky fragility as "ceiling" (2007??), financial cleansing as floor
- Income distribution, consumption, household debt in fully dynamic context
  - Explore formal dynamics of the "Consumer Age"

Conclusion: Trivial, Intriguing, Profound?

- Trivial: neoclassical synthesis in new clothes? But …
  - Fundamentally different adjustment mechanism
  - Full employment inherently unstable
  - Institutional links to downside containment
  - Possibility that demand never reaches potential path
- Intriguing: a truly different perspective. But …
  - Upward instability of demand a robust empirical feature of modern capitalism?
  - Empirical role of autonomous demand in containment?
- Profound: A simple idea, but one that could change the way we think about growth.

Kaleckian Growth Model

- Autonomous investment function drives growth in K
  - Capacity utilization /animal spirits / distribution
  - Demand and growth
- Issues
  - Target capacity utilization as equilibrium result vs. behavioral concept
  - How to explain “moments” of near full employment?
- Useful, but explore different conception