بنام خدا

چرخه های تجاری برون زا و درون: مفاهیم و طبقه بندی

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کارگاه ادوار تجاری

بهمن

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Business Cycles (BCs)

- **Historical view**: A number of economists including Schumpeter introduced a classification of BCs according to their periodicity.

Cycle & wave	دوره (سال)
Kitchin: inventory cycle	5–3
Juglar: fixed investment cycle	11–7
Kuznets: infrastructural investment wave	25–15
Kondratiev: technological waves	60–45

- Burns & Mitchel: Measurement & descriptive account of BCs; BC calendar
- **Modern view**: Slutsky & Frisch approach.
- **Stylized facts**: co-movement of broad aggregate economic variables (output, cons., inv., emp.) with different levels of volatility & lag/lead is the main feature of BCs.
- BCs are not infrequent. BCs have frequency of more than a year & less than a decade.
- A good model can match the magnitude of BC fluctuation & their volatilities.

BCs: Frisch-Slutsky Perspective

- **F**-S differentiate between the impulse which starts a movement in economic activity & the propagation mechanism which subsequently transmits the impulse (shock) through the economy over time.
- The propagation mechanism is the endogenous economic mechanism that transforms the impulse into persistent economic fluctuations or BCs.
- In an aggregate supply-demand setting the impulse can be thought of an exogenous change in a shock variable that shifts AD & AS curves.
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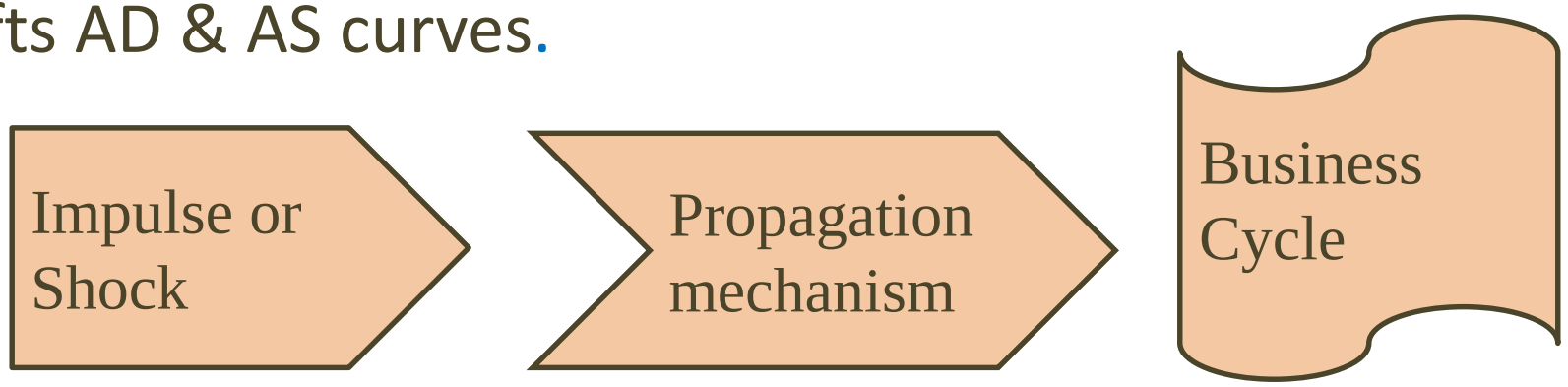

Impulse-Propagation a useful & simplifying approach

- For explaining macroeconomic fluctuations, economists often rely on models in which a single, recurrent shock acts as the main, or even the sole, driver of BC.
- It is a justifiable practice because it provides a parsimonious & unifying explanation.
- This approach is also useful when a model can capture diverse business-cycle impulses (triggers) that share a common propagation mechanism.
- Multiple shocks that produce similar impulse responses for all variables of interest can be considered as the same shock (Angelotos et al 2020).

Impulse-Propagation & Swedish flag classification

- The propagation mechanism reflects the structure of the economy & governs the way the economy reacts to shocks & how long it takes for adjustment to a shock.
- Frisch argues that although shocks to the economy may follow an unsystematic pattern, the structure of the economy may imply that it reacts to disturbances in a systematic way. Rocking chair example.
- Leijonhufuvd (1982) classifies traditional macroeconomic theories on the basis of the hypothesis they make regarding the impulses that initiate and propagation mechanisms that turn the impulses into output movements or BCs.

محرک \ نحوه سرایت	اسمی	مخلوط	واقعی
اسمی	Monetarists (Friedman) ا–ا		و – ا
مخلوط			
واقعی	Keynesians ا– و		Keynes و – و RBC

Uncertainty, Exogenous & Endogenous BC classification

	Uncertainty Source	Impulse	Propagation
Business Cycles	Exogenous (Intrinsic uncertainty: Fundamentals)	Real (TFP shock)	e.g. Time to build, Capital accumulation.
		Nominal (monetary shocks)	e.g. Sticky prices, Inflation tax.
		Expectation-Driven (News shocks)	e.g. Capital Capacity Utilization.
	Endogenous (Extrinsic uncertainty: Beliefs)	Sunspot shocks (Optimism and Pessimism waves)	Indeterminacy (e.g. indeterminate Labor Supply).

In the absence of taste or technology shocks & even when the environment is stationary, the economy might be unstable & exhibit fluctuations when exogenous & endogenous uncertainty is present.

What drives short-run fluctuations in macroeconomic activity & asset prices: real shocks

- The answers provided to these questions by macroeconomic theory are quite different from those often heard in the public arena (Angelotos 2010).
- Standard macro models attribute short-run economic fluctuations to high-frequency movements in technologies, preferences, & government policies.
- Key debate in macroeconomics: are BCs the optimal response of individual agents to changes in their environment or not?
- If the answer is affirmative BCs are optimal & public anti-cyclical policies to dampen them are welfare-reducing.
- If negative & fluctuations are due to market imperfections (monopoly power, price or wage rigidities), cycles are sub-optimal & public policy is required.
- RBC models attribute short-run fluctuations to high-frequency movements (shocks) in technologies & preferences that continually impinge on the economy.
- Impulses & adjustment mechanism in the basic RBC model are “real”. Since RBC is a frictionless model there is no need for anti-cyclical policy.

BCs with exogenous fundamental shocks: Real Business Cycles

A micro-founded model that generates cycles due to real (fund) impulses .

Basic assumptions

1. Household and firms optimize over their choices.

- 2. Market Clearing markets. There is no disequilibrium in the markets and no agent is constrained from taking the market price, hence no "involuntary" unemployment.
- 3. Absence of nominal rigidities, prices are flexible, hence money is immaterial.
- 4. If exogenous tech shocks (Impulses) are positive & persistent, higher aggregate employment raises output. Consequently, both consumption & investment increase, hence the sort of co-movement we observe in aggregate time series is generated.
- Fluctuations are not movements along a trend but movements of the trend itself. RBC is an integrated approach to the theory of growth & fluctuations.
- Resulting fluctuations are of equilibrium variety. No need for gov. intervention.
- Shortcoming: heavy reliance of RBC models on large tech shocks to explain observed business cycle facts.

Expectations & Non-fundamental Shocks

- BC models can explain some of the qualitative & quantitative features of observed fluctuations emanating from the effects of tech. taste & gov. policy, but are not able to credibly explain many phenomena.
- A difficulty noted by Kocherlakota (2010) is that in macroeconomics virtually every variable is endogenous, but as in RBC models the economy is hit by some kind of exogenously specified shocks if the endogenous variables in the model are to move.
- Mainstream macroeconomic models largely sidestepped the role of non-fundamentals (sentiments & “animal spirits”) as sources of BCs until the recent decades.
- During the last 25 years a growing body of literature purports that changes in sentiments & expectations may be an important independent driver of BCs & short-run economic fluctuations can be attributable to non-fundamental shifts in expectations regarding economic activity.
- “Animal spirits”, “market psychology”, “irrational exuberance,” and “confidence. Are the kind of undesirable fluctuations are & justify intervention.
- Pigou (1927) and Keynes (1936) had this idea & postulated that waves of pessimism or optimism regarding future could influence current economic conditions.
- Keynes advanced the argument that the economy might be driven by investors' animal spirits (not taste & tech shocks), without having any close relation to economic fundamentals.

Three distinct views regarding the role of sentiments in BCs

- **1-Irrational animal spirits**
- Advocates include, Keynes (1936), Akerlof & Shiller (2010), De Grauwe & Ji (2016) view purely psychological waves of optimism & pessimism as the source of macroeconomic fluctuations.
- This implies that any expansion driven by animal spirits must eventually lead to a bust as fundamentals remain unaffected.
- The importance of beliefs & expectations in economics together with the possibility of an involuntary unemployment equilibrium is one of the most important elements of the economics of Keynesian.
- Investors may be seized by moods of optimistic or pessimistic expectations with no necessary relation to changes in tastes or tech.
- This legacy was overshadowed by price & wage rigidity explanations of economic fluctuations by Keynesian economists.
- Like Keynes, Akerlof & Shiller know that managing these animal spirits requires government intervention—simply allowing markets to work won't do it (Nowzohour & Stracca 2017).

2-Self-fulfilling animal spirits

- For adherents to this view (Cass & Shell, 1983, Farmer, 1999 & 2013, Acharya et al. 2017, Benhabib et al, 2010), purely psychological, sunspot-driven waves are the cause of economic fluctuations.
- The moods of optimism or pessimism disconnected from any changes in fundamentals cause investors to either expand or contract investment spending.
- This, in turn, can lead to either an overall economic expansion or a contraction, thereby justifying the optimistic or pessimistic expectations.
- Advocates of this group believe that actions by agents following waves of optimism (or pessimism) can change fundamentals resulting in the occurrence of a boom (or bust). Thus, these animal spirits can become self-fulfilling.
- This alternative view of business fluctuations may be described as non-fundamental or endogenous.
- Shiller (2017) provides a different interpretation regarding a similar view, emphasizing the role of narratives as drivers of economic fluctuations and underpinning changes in sentiment over time.

Sunspots (shocks to beliefs caused by non-fundamental uncertainty acting as impulse, Farmer 2012)

- Explaining randomness in the economy: part of is due to the randomness in the physical world which is transmitted through the econ. fundamentals (ETP). There is also randomness emanating from behavior of individuals. Peck & Shell (1985) label it "market uncertainty" which is not transmitted through the fundamentals.
- Ss Refers to an extrinsic random variable & is related to the concept of extrinsic uncertainty. Ss is a R. V. that does not affect (does not come from changes in) econ. fundamentals; implying a random influence that matters only because people think it matters (Angelotos).
- Jevons was the first to use the term. Cass & Shell (1983) use the term for ERV & were the first to show that sunspots can have real effects on consumption, even in the presence of a complete set of financial markets (Farmer 2012).
- Sunspot models are complete rational-expectations, general-equilibrium models that offer an explanation of excess volatility (shell 2007).
- Occurrence of indeterminacy & sunspot equilibria can be understood as a coordination problem.

Indeterminacy & Sunspot Equilibria

- Sunspots-driven indeterminacy models have been shown to be able to replicate a number of key BC stylized facts without resorting to technology shocks
- Changes to the standard RBC model like production externalities or imperfect competition can deliver sufficient aggregate increasing returns to yield indeterminacy of the dynamical system.
- Small modification of the assumptions of RBC models can result in significant departures from its implication (Ben habib & Farmer 1999).
- As a result, these animal spirits or sunspots models are able to generate business cycle fluctuations in the absence of any shocks to fundamentals; instead cycles are the result of iid expectational shocks.
- Suppose that a subset of agents becomes optimistic about the rate of return of an asset and decides to increase its investment in it.
- If there exist sufficiently strong strategic complementarities in the economy, then it is in the other agents' best interest to invest more in that asset as well (see Cooper and John, 1988).

الگوی ادوار تجاری حقیقی متعارف

- $Y_t = A_t K_{t-1}^{\alpha} N_t^{1-\alpha}$
- $K_t = (1-\gamma)K_{t-1} + Y_t - C_t$
- $\frac{1}{C_t} = E_t\left[\beta \frac{1}{C_{t+1}}(1-\gamma+\alpha\frac{Y_{t+1}}{K_t}\right]$
- $C_t N_t^{\gamma} = (1-\alpha)\frac{Y_t}{N_t}$
- $lnA_t = \theta lnA_{t-1} + u_t$
- $K_o = \bar{K}, A_o = \bar{A}$

- $\lim_{T\to\infty} E_t\left[\beta^T \frac{K_T}{C_T}\right] = 0$

Indeterminacy & Sunspot Equilibria

- As a result, agents' expectations of a higher rate of return are validated, which in turn causes an investment spurt without any change in economic fundamentals. We can repeat this argument to construct infinitely many equilibrium paths & therefore the original equilibrium is said to be indeterminate.
- This argument can be repeated to construct infinitely many equilibrium paths & therefore, the original equilibrium is said to be indeterminate.
- This process is self-fulfilling: it occurs because individuals think it occurs.
- The impulses are the sunspot & equilibria that are contingent on such extrinsic shocks are sunspot equilibria. The resulting multiple equilibria may give rise to economic fluctuations driven by self-fulfilling expectations.

multiple equilibria

- Farmer & Guo (1994) generate indeterminacy by introducing externality in production in a standard RBC model. Without this, that is when preferences and technology are convex, sunspots cannot matter (Shell).
- With this addition there can be ME paths which leads to the existence of equilibrium BCs driven by sunspots. This class of ME macroeconomic models suggest that agents' perceptions about the state of the economy is a significant independent factors for BCs.
- Wen (1998) replaced the externality with capacity utilization, reducing the size of the externality to a more reasonable level, while still matching business cycle facts without positing any intrinsic uncertainty.
- Benhabib & Wen (2002) utilize a simple general equilibrium model of indeterminacy to capture Keynesian type demand-driven business cycle while keeping the assumption of market clearing & flexible prices. Via Investors' animal spirits they are able to generate forecastable movements in aggregate variables.
- There are other mechanisms that can generate ME in DGE. Farmer (2006, 2012, 2013) introduced an endogenous business cycle model in which there is not just dynamic indeterminacy, but also steady-state indeterminacy.

3-News or confidence shocks & BCs

- Beaudry and Portier (2006) studied time-series data & conclude that news about future productivity may be an important driver of BCs & identified a model that news could generate fluctuations & co-movement.
- The new literature begins with Beaudry and Portier (2006, 2007), who analyze Beaudry & Portier (2014), Barsky & Sims (2012), Blanchard et al. (2013) argue that agents have access to a non-measurable source of imperfect information regarding future path of the economy.
- The news view of BCs suggests that these phenomena are mainly the result of agents having incentives to continuously anticipate the economy's future demands.
- If an agent can correctly anticipate a future need, he can gain by trying to preempt the market and invest early as to make goods readily available when the predicted needs eventually appear. If many agents adopt similar behavior, because they receive related news about future developments, this will lead to a boom period.
- Based on signal or news agents act to provide (supply) for the economy's future demand today.
- Changes in agents' information, due to the arrival of news, can cause business cycle fluctuations driven by expectational change.
- In this framework, the economy is subject to recurrent booms (if the signal was correct) and occasional busts (if the signal was false).

Confidence Shocks & BCs

- The current literature distinguish two types of confidence shocks (Barsky & Sims 2012).
- I-New information about future technology that is orthogonal to current technology., such shocks are usually called “technology news shocks”; are supply-side type shocks with permanent effect on output.
- Example, innovations that have already been invented & are known to agents but have not yet been implemented hence have not yet affected productivity.
- Beaudry & Portier (2004) include this kind of shock, representing a signal about future technology, into an RBC model.
- Blanchard et al. (2013) consider noise (i.e. false) shocks about future technology. Schmitt-Grohe and Uribe (2012) generalize the concept to a wider range of shocks.
- II-Sentiment (confidence) shocks relating to nonfundamental shifts in consumption, investments (demand side), due to expectations about future prospects of the economy. It is similarities to Keynes’s “animal spirits” that influence entrepreneurs willingness to undertake investment activity & hence, drive cyclical fluctuations.

با تشکر از توجه شما