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Information Technology and Healthcare Productivity

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Aggregate IT literature

- The previous literature on the productivity impact of IT showed little or nothing
  - Bob Solow (1987) “the computer age is everywhere except in the productivity statistics”
  - Brynjolfsson (’93) Review of literature and can’t see impact despite managers being convinced and firms investing
- Empirical issues
  - Bresnhan (1986) Derived demand by firms for IT is very high
  - Brad Delong (2000): early on in the IT revolution, IT stocks were low and growth was fast, but not enough to significantly affect aggregate productivity

Paradox resolved

- Paradox resolved by considering complementarity between organization and IT
  - Bresnahan and Greenstein (Brookings 96): organizationally complex uses of IT are slowest to upgrade and improve
  - Bresnahan, Brynjolffson, and Hitt (‘02) Can see productivity in triple interaction: IT, decentralized organization, and skilled labor
  - Brynjoffson and Hitt (‘03) Now can see computers with standard rate of return after 1 year but 5x returns after 5-7 years. Unobserved organizational adjustments?
  - Bloom et al (’12) comparing EU and US firms’ IT adoption. They find organizational practices drive higher US IT productivity.
- No paradox -- look closely at a specific sector
  - Hubbard trucking: trucking firm adopts and capacity utilization rises
  - Athey and Stern (‘99) show relationship between IT and training

Healthcare observation

- Healthcare lags the rest of the US economy in terms of process
  - Plenty of drugs and devices
  - Plenty of skills, capital, and science
- User experience is terrible
  - Registration / collection of information
  - Transfer of information with referral
  - Price disclosure or comparison
  - Convenient hours
  - Wait times and customer service

$\Rightarrow$ all mostly missing

$\Rightarrow$ Poor management: physicians do not like to be managed, especially by someone who is not a physician

Health IT: adoption and use

- Adoption of EMR
  - ERP of healthcare. Fairly recent.
  - Government mandates; Kind of a natural experiment
- Evidence thus far: Healthcare IT does nothing except perhaps raise costs
  - Large literature shows no change in outcomes
  - In some cases better measurement of treatments and diagnoses – therefore higher billing / costs
  - Physicians dislike changes in workflow

Two steps

- Adoption: someone decides to invest in an expensive piece of software
- Use: managers take the information generated and make better decisions with it.
  - Perhaps change asset ownership, job descriptions, hierarchies
- These two steps are linked: What is the reason for adoption?
  - In the US lately, adoption is because the government requires it.
- Airline CRS provides counterexample of early adoption

Why US healthcare problem is so difficult to solve

- What is the organizational unit with the incentive to adopt and use the EMR?
  - Need to decide WHY you want the EMR
  - Corporate form providing healthcare services is hugely variable, so it is not obvious what the physicians are incentivized to do.
    - Bill? Prevent disease? Manage chronic diseases?
    - Usually the former
  - Need physicians to use data to determine actions
    - Situation-specific: number of patients, procedures, costs.
    - Analysis cannot be done by IT people
- Analysis that is useful and specific to corporate form, patient pop, and financial incentives is costly. What is payoff?

Not hopeless

- VA experience
  - Note one budget for all veterans and one hierarchy
  - Own EMR: big success in drugs and mistakes
- European healthcare systems much better positioned
  - Unitary system (in principle!) so one residual claimant
  - One software system so can ensure compatibility
  - One population (with likely variants)
  - Hierarchy with organizational decision rights in hands of government

US reorganization

- Change organizational form of providers to be more functional
  - ACOs: groups of providers paid by capitation, bundles, episodes, or quality
  - (existing) Medicare Advantage and other HMOs
  - Traditional Medicare will pay for quality and episodes
- However, all US agents have some flaw preventing effective IT use
  - Physicians have no capital, no collateral, small size
    - Cannot create own EMR
    - Good data and scale economies both require size
  - Insurer cannot deploy EMR across many providers
  - Hospital has poor incentives because it is the cost center – we want less of it

Concerns

- Hospitals own the EMR; physicians get it when they affiliate – then perforce a hospital is inside the ACO
- Hospitals will dominate; less incentive to lower costs
- Mergers made for market power, not productivity
- First-mover disadvantage: both insurer and hospital
- Problem so complex that small moves may not increase productivity; large moves difficult
- Lack of trust: difficult for multiple partners to share rents effectively

Research directions

- Model incentives of different types of providers to switch to coordinated care
- Payor or government incentives to remove first-mover disadvantage in adopting coordinated care
- Effect of firm boundaries on incentives, information flow, ‘culture’ -- determine optimal structure and composition of ACO
- Impact of compatibility in EMR systems across competitors