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FINANSIJSKI SISTEM: AMORTIZER ILI POJAČIVAČ ŠOKA?

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Allen i Carletti daju odgovor na pitanje: "Koji je to tržišni nedostatak koji opravdava toliko intenzivno regulisanje bankarstva?"

Cilj ovog rada je obradi ovo pitanje i ispita implikacije za ulogu finansijskog sistema kao amortizera ili pojačivača šoka.

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FINANCIAL SYSTEM: SHOCK ABSORBER OR AMPLIFIER?

This paper was presented at the Sixth BIS Annual Conference 2007, "Financial system and macroeconomic resilience", 18-19 June 2007, Brunnen, Switzerland.

Allen and Carletti provide an answer to the question: "What is the market failure that justifies so much regulation of banking?"

The purpose of this paper is to address this question and examine the implications for the role of the financial system as a shock absorber or amplifier.

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Poslednjih decenija došlo je do značajne deregulacije u mnogim industrijama. Međutim, sektor koji ostaje jako regulisan jeste bankarstvo. Zašto je to tako? Jedan od razloga je zaštita potrošača, ali to je relativno slab razlog. Glavni razlog za regulisanje bankarstva je da se preduprede finansijske krize. Međutim, bankarska regulativa je neuobičajena kada se uporedi sa drugim vrstama regulative u tome što nema široke saglasnosti oko toga koji je to tržišni nedostatak.

Kod drugih vrsta regulative najčešće postoji saglasnost. Na primer, regulativa protiv trustova neophodna je da se spreče pogubni efekti monopola, pri čemu tržišni nedostatak čini nepostojanje konkurencije. Kod regulative o životnoj sredini, nema tržišta: zagađivači ne moraju da plate cenu da bi kompenzovali ljude kojima nanose štetu. Kada bi postojalo tržište na kome bi to morali da čine, postojala bi efikasna alokacija resursa bez potrebe za intervencijom. Ali ne postoji takvo tržište, zato je neophodno da se umesto toga primeni regulativa. Nasuprot tome, koji je to tržišni nedostatak koji opravdava toliko intenzivno regulisanje bankarstva? Cilj ovog rada je obradi ovo pitanje i ispita implikacije za ulogu finansijskog sistema kao amortizera ili pojačivača šoka.

Mnogi bankarski propisi u SAD su prvobitno doneti kao reagovanje na bankarsku krizu početkom 1930-tih godina i percipira se da su oni bili značajan faktor koji je doprineo oštrini Velike depresije. Iskustvo sa Depresijom bilo je tako strašno da postoji široka saglasnost da se ne sme dozvoliti da se ona ikada ponovo dogodi i otuda kao rezultat uvođenje ekstenzivne bankarske regulative. Ta regulativa nije bila vođena teorijom već serijom odvojenih reformi. U mnogim evropskim zemljama, kao što su Francuska i Švedska, reagovanje je bilo znatno jače i uključilo je državno vlasništvo nad bankarskim sektorom. Putem propisa ili javnog vlasništva, bankarski sektor je bio visoko kontrolisan.

Ove reforme su bile vrlo uspešne u smislu sprečavanja bankarskih kriza. Od 1945. do 1971. godine bila je samo jedna bankarska kriza u svetu. To je bilo u Brazilu 1962. godine i ona se javila zajedno sa monetarnom krizom. Osim toga nije bilo nijedne bankarske krize (Bordo

et al. (2001)). Razlog što su krize bile sprečene u tome je što su uzimanje rizika i konkurencija bili u tolikoj meri kontrolisani da je finansijski sistem prestao da obavlja svoju funkciju efikasne alokacije resursa. Finansijska represija koja je proizašla iz ekscesne regulative i javnog vlasništva na kraju je odvela do pritiska za finansijskom liberalizacijom. Počev od 1970-tih godina, regulativa je uklanjana i u mnogim zemljama sa državnim vlasništvom nad bankama banke su privatizovane.

Finansijska liberalizacija nije samo dozvolila finansijskom sistemu da ispunjava svoju ulogu u alokaciji resursa. Takođe je vodila ka vraćanju bankarskih kriza kojih je bilo mnogo u poslednje tri decenije. Mnogo ih je bilo u zemljama sa novim tržištima, ali mnogo ih je bilo i u razvijenim zemljama kao što su Norveška, Švedska i Finska početkom 1990-tih godina. Bordo et al. (2001) nalaze da se učestalost kriza u periodu posle 1971. godine ne razlikuje mnogo od onog kako je bilo pre 1914. godine.

Postoji obimna literatura o troškovima kriza i njihovom rešavanju (videti na pr. Bordo et al. (2001), Hoggarth et al. (2002), Boyd et al. (2005)). Veliki deo debate je bio posvećen tome kako tačno izmeriti troškove. Veliki deo rane literature usredsređen je na fiskalne troškove. To je iznos koji košta državu da rekapitalizuje banke i da rambursira osigurane deponente i možda druge kreditore. Međutim, to su većinom transferi a ne pravi troškovi. Kasnija literatura usmerila se više na izgubljeni autput prema reperu kao što je trend stope rasta.

Ima dva važna aspekta troškova kriza kada se mere na ovaj način. Prvi je visok prosečan trošak a drugo je velika varijacija iznosa troškova. Boyd et al. (2005) procenjuju prosečnu diskontovanu sadašnju vrednost gubitaka na više različitih načina. Zavisno od korišćenog metoda, srednji gubitak je između 63% i 302% od realnog per capita GDP u godini pre početka krize. Ovaj raspon gubitaka je vrlo veliki. U Kanadi, Francuskoj, Nemačkoj i SAD, koje su imale blage nesistemske krize, nije bilo značajnog usporavanja rasta i troškovi su bili beznačajni. Međutim, na drugom kraju ekstrema, usporavanje i diskontovan gubitak na autputu bili su izuzetno visoki. U Hong Kong SAR, diskontovana sadašnja vrednost gubitaka

In recent decades there has been significant deregulation in many industries. However, a sector that remains heavily regulated is banking. Why is this the case? One reason is consumer protection, but this is a relatively minor one. The main reason for banking regulation is to prevent financial crises. However, banking regulation is unusual compared to other types of regulation in that there is no broad agreement on what the market failure is that justifies it.

With other types of regulation, there typically is agreement. For example, antitrust regulation is necessary to prevent the pernicious effects of monopoly, the market failure in this case being the lack of competition. With environmental regulation, there is a missing market: polluters do not have to pay a price to compensate the people they harm. If there were a market in which they did have to do so, there would be an efficient allocation of resources and no need for intervention. But there is no such a market, so it is necessary to regulate instead. In contrast, what is the market failure that justifies so much regulation of banking? The purpose of this paper is to address this question and examine the implications for the role of the financial system as a shock absorber or amplifier.

Many banking regulations in the United States were originally introduced as a reaction to the banking crises in the early 1930s and the perception that these were an important contributing factor to the severity of the Great Depression. The experience of the Depression was so awful that it was widely agreed that it must never be allowed to happen again, and extensive banking regulation was introduced as a result. The regulation was not guided by theory but was rather a series of piecemeal reforms. In many European countries, such as France and Sweden, the response was much stronger and involved government ownership of the banking sector. Through either regulation or public ownership, the banking sector was highly controlled.

These reforms were very successful in terms of preventing banking crises. From 1945–71, there was only one banking crisis in the world. That was in Brazil in 1962, and occurred together with a currency crisis. Apart from that there was not a single banking crisis (Bordo et

al (2001)). The reason that crises were prevented is that risk-taking and competition were controlled so much that the financial system ceased to perform its function of allocating resources efficiently. The financial repression that resulted from excessive regulation and public ownership eventually led to pressures for financial liberalisation. Starting in the 1970s, regulations were lifted, and in many countries with government ownership banks were privatised.

Financial liberalisation not only allowed the financial system to fulfil its role in allocating resources. It also led to the return of banking crises, of which there have been many in the last three decades. Many have been in emerging market countries, but many have also been in developed countries such as Norway, Sweden and Finland in the early 1990s. Bordo et al (2001) find that the frequency of crises in the period since 1971 is not that different from what it was before 1914.

There is an extensive literature on the costs of crises and their resolution (see eg Bordo et al (2001), Hoggarth et al (2002), Boyd et al (2005) and Honohan and Laeven (2005)). Much of the debate has been concerned with how exactly to measure costs. A large part of the early literature focused on fiscal costs. This is the amount that it costs the government to recapitalise banks and reimburse insured depositors and possibly other creditors. However, these are mostly transfers rather than true costs. The subsequent literature has focused more on the lost output relative to a benchmark such as trend growth rate.

There are two important aspects of the costs of crises when measured this way. The first is the high average cost and the second is the large variation in the amount of costs. Boyd et al (2005) estimate the average discounted present value of losses in a number of different ways. Depending on the method used, the mean loss is between 63% and 302% of real per capita GDP in the year before the crisis starts. The range of losses is very large. In Canada, France, Germany and the United States, which experienced mild non-systemic crises, there was no significant slowdown in growth and costs were insignificant. However, at the other extreme, the slowdown and discounted loss in

bila je 1.041% od realnog autputa u godini pre krize. Varijacija troškova podcrtava značaj pitanja da li je finansijski sistem amortizer šoka ili pojačivač.

Veliki prosečni troškovi i vrlo visoki prateći troškovi krize čine da donosioci politike imaju averziju prema njima. Zato u mnogim slučajevima oni idu toliko daleko da bi izbegli krize. Međutim, nije jasno da li je to optimalno. Ima značajnih troškova u vezi sa regulativom za izbegavanje kriza a u mnogim slučajevima očekivani troškovi krize nisu naročito visoki. Ali šta su ovi troškovi regulative? Da li su krize uvek loše i mogu li one nekad da donesu prednosti? Još jednom, ključno pitanje je šta je tačno tržišni nedostatak.

Bazelski sporazum ilustruje nedostatak konsenzusa o osnovnom tržišnom nedostatku. Enormna količina napora je učinjena da se dizajniraju ova pravila. Milijarde dolara banke troše na postavljanje sistema za njihovu primenu. Pravila pružaju primer regulative koja je motivisana empirijom a ne teorijom. Praktičari su postali eksperti za detalje visoko složenog sistema za šta nema široko usaglašene argumentacije zasnovane na ekonomskoj teoriji. Šta je optimalna struktura kapitala? Koji tržišni nedostatak čini neophodnim nametanje zahteva za adekvatnošću kapitala? Zašto ne može da se prepusti tržištu da određuje odgovarajući nivo kapitala? Nema dobrih odgovora na ova pitanja u teorijskoj literaturi.

Ključna stvar je da upravo zbog toga što postoji neka vrsta asimetrične informacije ne znači nužno da tržište ima nedostatak i da je intervencija time opravdana. Mora se pokazati da država može da deluje bolje nego tržište. U literaturi o adekvatnosti kapitala, često se tvrdi da je regulisanje kapitala neophodno da bi se kontrolisao problem moralnog hazarda koji stvara postojanje osiguranja dopozita. Delimično osiguranje dopozita bilo je uvedeno u SAD tokom 1930-tih godina da bi se predupredili juriši na banke ili, šire, finansijska nestabilnost. Zbog toga što banke emituju osigurane obligacije dužničkog tipa (tj. bankarski depoziti), one imaju podsticaj da prihvate ponašanje prenosa rizika. Drugim rečima, banka ima podsticaj da ide u ekscesno rizične investicije, jer zna da u slučaju neuspeha gubitak snosi fond za osiguranje depozita a u

slučaju uspeha akcionari banke žanju koristi. Postojanje kapitala banke umanjuje podsticaj da se uzima rizik, jer u slučaju stečaja, akcionari gube svoj kapital. Tako, zahtevi za adekvatnošću kapitala su indirektno opravdani željom da se spreče finansijske krize.

Međutim, bilo koja analiza optimalne politike mora da meri troškove i benefite regulative. To se može učiniti samo u modelu koji eksplicitno modelira mogućnost krize. U odsustvu eksplicitnog modeliranja troškova finansijske krize, teško je podržati optimalnost intervencije. Kao zaključak, teško je dati dobre razloge za zahteve za adekvatnošću kapitala kao sredstva za neutralisanje uzimanja rizika do koga dovodi osiguranje depozita.

Ima brojnih teorija o krizama (videti na pr. Holmstrom and Tirole (1998), Caballero and Krishnamurthy (2001) i Diamond and Rajan (2005)). Ova literatura sadrži mnoge interesantne uvide koji su usmereni na određene aspekte ili vrste kriza. U ovom radu razmatramo okvir koji su razvili Allen and Gale (2004a, 2004b, 2007) i Allen and Carletti (2006, 2007) koji omogućava analizu širokog kruga fenomena povezanih sa krizama. Ovi fenomeni uključuju ekscesnu volatilnost cene aktive, juriše na banke, finansijsku krhlost, zarazu i mehure cena aktive. Tvrdimo da ključno pitanje koje određuje da li je finansijski sistem amortizer šoka ili pojačivač jeste da li ima nedostatka na tržištu. Bez nedostatka na tržištu, finansijski sistem je amortizer šoka. Sa nedostatkom na tržištu, finansijski sistem je pojačivač i ovi fenomeni mogu da se jave.

Volatilnost - karakteristika hartije od vrednosti, robe ili tržišta da cene rastu ili padaju ubrzano u kratkom vremenskom intervalu. Mera za relativnu volatilnost hartija od vrednosti prema ukupnom tržištu je Beta.

Panika naspram fundamentalnih faktora

Mogu da se razviju dva pristupa krizi. Oba imaju dugu istoriju. Jedno gledište, koje je

output were extremely high. In Hong Kong SAR, the discounted PV of losses was 1,041% of real output the year before the crisis. The variation in costs underlines the importance of the issue of whether the financial system is a shock absorber or amplifier.

It is the large average costs and the very high tail costs of crises that make policymakers so averse to them. This is why in most cases they go to such great lengths to avoid crises. However, it is not clear that this is optimal. There are significant costs associated with regulations to avoid crises, and in many cases the expected costs of crises are not very high. But what are these costs of regulation? Are crises always bad or can they sometimes be advantageous? Once again, the key issue is what exactly the market failure is.

The Basel agreements illustrate the lack of consensus on the basic underlying market failure. An enormous amount of effort has been put into designing these rules; billions of dollars have been expended by banks in setting up systems to implement them. They provide an example of regulation that is empirically rather than theoretically motivated. Practitioners have become experts at the details of a highly complex system for which there is no widely agreed rationale based in economic theory. What is the optimal capital structure? What market failure necessitates the imposition of capital adequacy requirements? Why can't the market be left to determine the appropriate level of capital? There are no good answers to these questions in the theoretical literature.

Volatility - feature of securities, goods or markets that the prices rise or fall quickly in a short time interval. Measure for the volatility of securities relative to the total market is Beta.

The key point is that just because there is asymmetric information of some kind does not necessarily mean there is a market failure and that intervention is thus justified. It must be shown that the government can do better

than the market. In the literature on capital adequacy, it is often argued that capital regulation is necessary to control the moral hazard problems generated by the existence of deposit insurance. Partial deposit insurance was introduced in the United States in the 1930s to prevent bank runs or, more generally, financial instability. Because banks issue insured debt-like obligations (eg bank deposits), they have an incentive to engage in risk-shifting behaviour. In other words, the bank has an incentive to make excessively risky investments, because it knows that in the event of failure the loss is borne by the deposit insurance fund, and in the event of success the bank's shareholders reap the rewards. The existence of bank capital reduces the incentive to take risks because, in the event of failure, the shareholders lose their capital. Thus, capital adequacy requirements are indirectly justified by the desire to prevent financial crises.

However, any analysis of optimal policy must weigh the costs and benefits of regulation. This can only be done in a model that explicitly models the possibility of crises. In the absence of explicit modelling of the costs of financial crises, it is difficult to make a case for the optimality of intervention. As a corollary, it is difficult to make a case for capital adequacy requirements as a means of offsetting the risk-taking generated by deposit insurance. There are numerous theories of crises (see eg Holmstrom and Tirole (1998), Caballero and Krishnamurthy (2001) and Diamond and Rajan (2005)). This literature contains many interesting insights that focus on particular aspects or types of crises. In this paper we consider a framework developed in Allen and Gale (2004a, 2004b, 2007) and Allen and Carletti (2006, 2007) that allows a wide range of phenomena associated with crises to be analysed. These phenomena include excessive asset price volatility, bank runs, financial fragility, contagion and asset price bubbles. We argue that the key issue that determines whether the financial system is a shock absorber or amplifier is whether there is a market failure. Without a market failure, the financial system is a shock absorber. With a market failure, it is an amplifier and these phenomena can occur.

dobro izloženo kod Kindlebergera (1978), jeste da se krize javljaju spontano u vidu panike. Modernu verziju razvili su Bryant (1980) i Diamond and Dybvig (1983). Analiza je zasnovana na postojanju višestruke ravnoteže (panika postoji bar u jednoj ravnoteži dok ne postoji kod druge).

Drugo gledište tvrdi da kriza nastaje iz fundamentalnih razloga koji su deo poslovnog ciklusa (na pr. Mitchell (1941)). Osnovna ideja je da kada ekonomija ide u recesiju ili depresiju, povraćaji na aktivu banaka će biti niski. Pri njihovim datim fiksnim obavezama u formi depozita ili obveznica, banke ne mogu da ostanu solventne. Ovo može da preraste u juriš na banke. Gorton (1988) pokazuje empirijski da u SAD krajem 19 i početkom 20 veka vodeći ekonomski indikator zasnovan na obavezama firmi u stečaju može precizno da predvidi pojavu bankarske krize.

Panike

Gledište o panikama sugerira da su krize slučajni događaji, nepovezani sa promenama u realnoj ekonomiji. Klasična forma ovog gledišta sugerira da su panike rezultat "psihologije mase" ili "masovne histerije" (na pr. Kindleberger (1978)). Moderna verzija, koju su razvili Bryant (1980) i Diamond and Dybvig (1983), jeste da su juriši na banke samoispunjavajuća proročanstva. Pri datoj pretpostavci da ko prvi dođe bude prvi uslužen i skupaj likvidaciju neke aktive, postoji mnoštvo ravnoteža. Ako svako veruje da neće doći do panike, samo oni sa stvarnim potrebama za likvidnošću povlače svoja sredstva i ti zahtevi mogu da se ispune bez skupe likvidacije aktive. Međutim, ako svi veruju da će se kriza javiti, onda to postaje samoispunjavajuće proročanstvo jer ljudi jure da izbegnu da budu poslednji u redu. Koja će se od ove dve ravnoteže javiti zavisi od spoljnih varijabli ili "sunčevih pega". Mada sunčeve pege nemaju efekat na realne podatke o ekonomiji, one utiču na uverenje deponenata na način koji postaje samoispunjavajući.

Ključno pitanje u teorijama o panikama je koju ravnotežu odabrati i, konkretno, koji je mehanizam izbora ravnoteže. Sunčeve pege su pogodne pedagoški, ali ovo objašnjenje nema dovoljno sadržaja. Ono ne objašnjava zašto sunčeve pege treba da se koriste kao

koordinirajući alat. Postoji realan dokaz o tome šta pokreće krize. Ovo je naročito problem ako postoji želja da se koristi teorija za analizu politike.

Carlsson and van Damme (1993) pokazuju kako uvođenje male količine asimetričnih informacija može da eliminiše višestrukost ravnoteža u igrama koordinacije. Oni ove igre sa asimetričnim informacijama o fundamentalnim faktorima nazivaju "globalnim igrama". Njihov rad pokazuje da postojanje višestrukih ravnoteža zavisi od igrača koji imaju zajedničko znanje o fundamentalnim faktorima u igri. Uvođenje buke obezbeđuje da fundamentalni faktori više nisu zajedničko znanje i tako sprečava koordinaciju koja je bitna za višestrukost. Morris and Shin (1998) primenjuju ovaj pristup na modele monetarnih kriza. Rochet and Vives (2004) i Goldstein and Pauzner (2005) primenili su istu tehniku na bankarske krize.

Primena pristupa globalnih igara da se obezbedi jedinstvenost ravnoteže teoretski je privlačna. Ona precizno specifikuje vrednosti parametara zbog kojih se javlja kriza i dozvoljava komparativnu statičku analizu faktora koji utiču na ovu postavku. Ovo je bitan analitički alat za analizu politike. Međutim, ono što je zaista potrebno pored logičke konzistentnosti jesu empirijski dokazi da je takav pristup validan. Za sada ima malo empirijske literature. To je u kontekstu monetarnih kriza i u širem smislu je konzistentno sa pristupom globalnih igara (Prati and Sbracia (2002), Tillman (2004), Bannier (2005) i Chen et al. (2007)). U značajnom nedavnom prilogu, Chen et al. (2007) razvijaju globalni model igara povlačenja iz uzajamnih fondova. Koristeći detaljan set podataka, oni nalaze dokaze konzistentne sa njihovim modelom. Ovo predstavlja značajan dokaz koji podržava pristup globalnih igara.

Kada je reč o pitanju šta je nedostatak tržišta, problem koordinacije koji vodi do panike je jedan mogući odgovor. Problem je što bilo kakva ozbiljna analiza politike zahteva teoriju selekcije ravnoteža. Međutim, ovde nije učinjen značajan progres. Globalne igre daju jedan mogući pristup, ali za sada ima malo dokaza o tome koliko je empirijski relevantan taj pristup.

Panics versus fundamentals

Two approaches to crises can be developed. Both have a long history. One view, well expounded in Kindleberger (1978), is that they occur spontaneously as a panic. The modern version was developed by Bryant (1980) and Diamond and Dybvig (1983). The analysis is based on the existence of multiple equilibria (there is a panic in at least one equilibrium while in another there is not).

The second view asserts that crises arise from fundamental causes that are part of the business cycle (eg Mitchell (1941)). The basic idea is that when the economy goes into a recession or depression, the returns on bank assets will be low. Given their fixed liabilities in the form of deposits or bonds, banks may be unable to remain solvent. This may precipitate a run on banks. Gorton (1988) shows empirically that in the United States in the late 19th and early 20th centuries, a leading economic indicator based on the liabilities of failed businesses could accurately predict the occurrence of banking crises.

Panics

The panics view suggests that crises are random events, unrelated to changes in the real economy. The classical form of this view suggests that panics are the result of “mob psychology” or “mass hysteria” (eg Kindleberger (1978)). The modern version, developed by Bryant (1980) and Diamond and Dybvig (1983), is that bank runs are self-fulfilling prophecies. Given the assumption of first come, first served and costly liquidation of some assets, there are multiple equilibria. If everyone believes no panic will occur, only those with genuine liquidity needs will withdraw their funds, and these demands can be met without costly liquidation of assets. However, if everyone believes a crisis will occur, then it becomes a self-fulfilling prophecy as people rush to avoid being last in line. Which of these two equilibria occurs depends on extraneous variables or “sunspots”. Although sunspots have no effect on the real data of the economy, they affect depositors’ beliefs in a way that turns out to be self-fulfilling.

The key issue in theories of panics is which

equilibrium is selected and, in particular, what the equilibrium selection mechanism is. Sunspots are convenient pedagogically, but this explanation does not have much content. It does not explain why the sunspot should be used as a coordination device. There is no real account of what triggers a crisis. This is particularly a problem if there is a desire to use the theory for policy analysis.

Carlsson and van Damme (1993) show how the introduction of a small amount of asymmetric information could eliminate the multiplicity of equilibria in coordination games. They call these games with asymmetric information about fundamentals “global games”. Their work shows that the existence of multiple equilibria depends on the players having common knowledge about the fundamentals of the game. Introducing noise ensures that the fundamentals are no longer common knowledge and thus prevents the coordination that is essential to multiplicity. Morris and Shin (1998) apply this approach to models of currency crises. Rochet and Vives (2004) and Goldstein and Pauzner (2005) have applied the same technique to banking crises.

Using a global games approach to ensure the uniqueness of equilibrium is theoretically appealing. It specifies precisely the parameter values for which a crisis occurs and allows a comparative static analysis of the factors that influence this set. This is the essential analytical tool for policy analysis. However, what is really needed in addition to logical consistency is empirical evidence that such an approach is valid. Currently there is a limited empirical literature. This is in the context of currency crises and is broadly consistent with the global games approach (Prati and Sbracia (2002), Tillman (2004), Bannier (2005) and Chen et al (2007)). In an important recent contribution, Chen et al (2007) develop a global games model of mutual fund withdrawals. Using a detailed dataset, they find evidence consistent with their model. This represents significant evidence supporting the global games approach.

As regards the question of what the market failure is, the coordination problem that leads to panics is one possible answer. The problem is that any serious policy analysis requires a theory of equilibrium selection. However, this

Fundamentalni faktori

Alternativa gledištu sunčevih pega je da su bankarske krize prirodni izdanak poslovnog ciklusa. Ekonomski pad će smanjiti vrednost aktive banaka, povećavajući verovatnoću da banke ne budu u mogućnosti da odgovore svojim obavezama. Ako deponenti dobiju informacije o predstojećem padu ciklusa, anticipiraće finansijske poteškoće u bankarskom sektoru i pokušaće da povuku svoja sredstva.

Ovaj pokušaj će ubrzati krizu. Prema ovoj interpretaciji, krize nisu slučajni događaji već su odgovor na razvoj ekonomskih okolnosti.

Jedan broj autora razvio je modele bankarskih kriza uzrokovanih agregatnim rizikom. Na primer, Chari and Jagannathan (1988) usmeravaju se na problem izvlačenja signala u kome deo stanovništva posmatra signal o budućim prinosima. Drugi onda moraju da zaključe iz uočenih povlačenja da li je

Sunčeve pege

U ekonomiji ravnoteža sunčevih pega predstavlja ekonomsku ravnotežu kod koje tržišni ishod ili alokacija sredstava variraju na način koji nije u vezi sa ekonomskim fundamentalnim faktorima. To znači da ishod zavisi od spoljne slučajne promenljive, tj. neki slučajni uticaj koji je od važnosti zato što ljudi misle da je od važnosti. Koncept ravnoteže sunčevih pega definisali su David Cass i Karl Shell. Cass i Shell su takođe skovali izraz "sunčeve pege" više kao sugestivni a ne tehnički način da se kaže "spoljna slučajna promenljiva".

Poznavanje sunčevih pega je staro dok je značenje "sunčevih pega" u ekonomiji tek od nedavno. U 19. veku neki ekonomisti su istraživali da li sunčeve pege mogu da imaju realni uticaj na vremenske prilike, poljoprivredu i preko toga na cene. Drugim rečima, predlagali su da sunčeve pege mogu da budu fundamentalni impulsi koji vode ekonomiju. Moderno korišćenje izraza sunčeve pege je za razliku povezano sa pitanjem kako uočljivi signal koji nije u vezi sa fundamentalnim faktorima može ipak da ima uticaj na cene. U teoriji se naglašava da nefundamentalna promenljiva može da ima uticaj na cene ako utiče na očekivanja.

Okvir ravnoteže sunčevih pega daje osnovu za racionalna očekivanja ekscesne volatilnosti (volatilnosti koja proizilazi iz izvora različitih od slučajnosti kod fundamentalnih faktora). Prave ravnoteže sunčevih pega mogu da postoje u više situacija u ekonomiji, uključujući asimetrične informacije, eksternalnosti kod potrošnje ili proizvodnje, imperfektne komunikacije, nekompletna tržišta i ograničenja za učešće na tržištima.

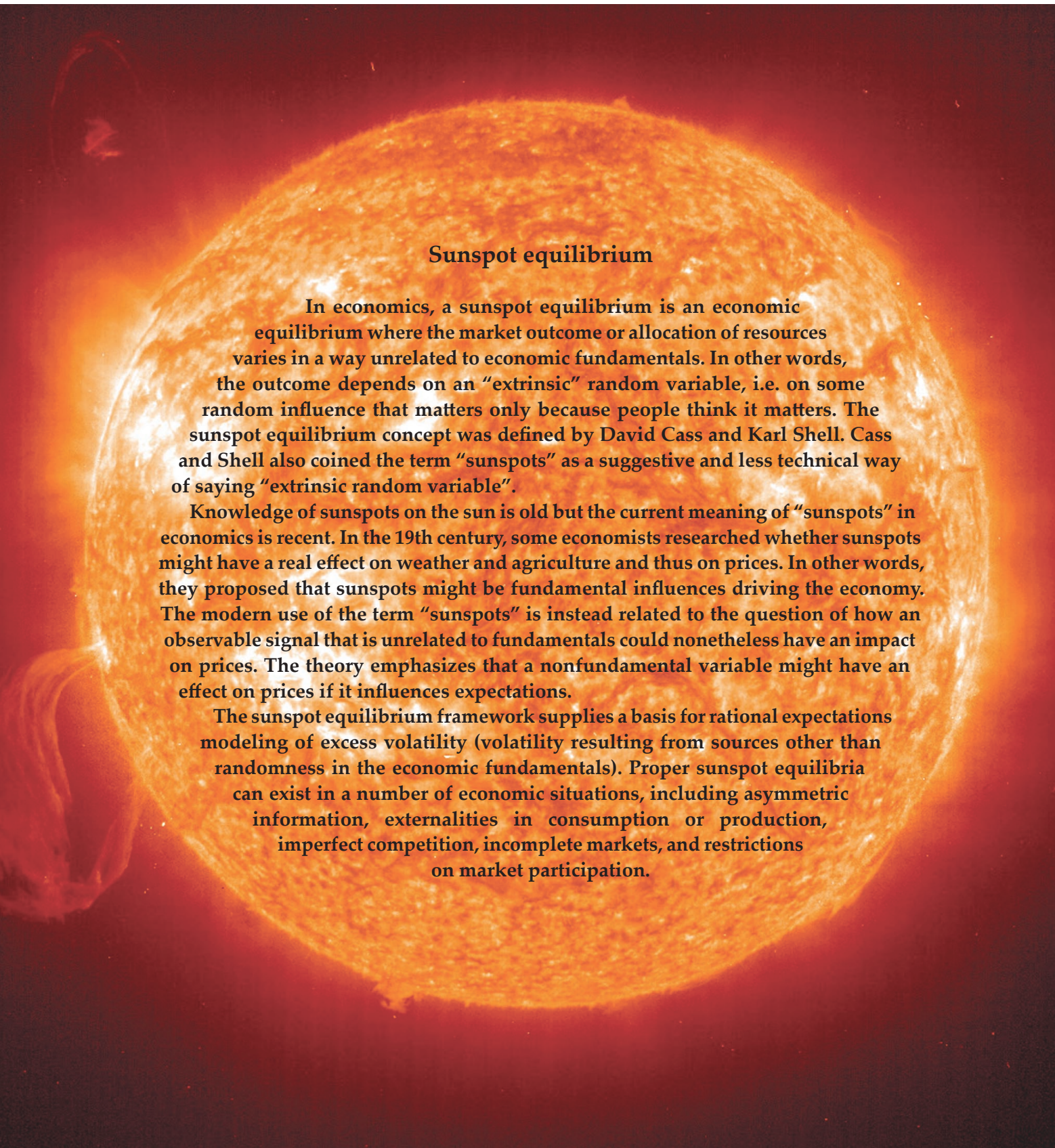
is not something on which much progress has been made. Global games provide one possible approach, but there is currently little evidence on how empirically relevant this approach is.

Fundamentals

An alternative to the sunspot view is that banking crises are a natural outgrowth of the business cycle. An economic downturn will reduce the value of bank assets, increasing the

possibility that banks are unable to meet their commitments. If depositors receive information about an impending downturn in the cycle, they will anticipate financial difficulties in the banking sector and try to withdraw their funds. This attempt will precipitate the crisis. According to this interpretation, crises are not random events but a response to unfolding economic circumstances.

A number of authors have developed



Sunspot equilibrium

In economics, a sunspot equilibrium is an economic equilibrium where the market outcome or allocation of resources varies in a way unrelated to economic fundamentals. In other words, the outcome depends on an “extrinsic” random variable, i.e. on some random influence that matters only because people think it matters. The sunspot equilibrium concept was defined by David Cass and Karl Shell. Cass and Shell also coined the term “sunspots” as a suggestive and less technical way of saying “extrinsic random variable”.

Knowledge of sunspots on the sun is old but the current meaning of “sunspots” in economics is recent. In the 19th century, some economists researched whether sunspots might have a real effect on weather and agriculture and thus on prices. In other words, they proposed that sunspots might be fundamental influences driving the economy. The modern use of the term “sunspots” is instead related to the question of how an observable signal that is unrelated to fundamentals could nonetheless have an impact on prices. The theory emphasizes that a nonfundamental variable might have an effect on prices if it influences expectations.

The sunspot equilibrium framework supplies a basis for rational expectations modeling of excess volatility (volatility resulting from sources other than randomness in the economic fundamentals). Proper sunspot equilibria can exist in a number of economic situations, including asymmetric information, externalities in consumption or production, imperfect competition, incomplete markets, and restrictions on market participation.

ta grupa primila nepovoljan signal ili je potreba za likvidnošću visoka. Chari and Jagannathan su u stanju da pokažu da se krize javljaju ne samo kada su izgledi loši već i kada se pokaže da je potreba za likvidnošću visoka.

Polazeći od empirijskog rada Gortona (1988) koji je odredio da su bankarske krize u XIX veku bile predskazane vodećim ekonomskim indikatorima, Allen and Gale (1998) razvili su model koji je konzistentan sa gledištem poslovnog ciklusa na poreklo bankarskih kriza. Oni uzimaju da deponenti mogu da posmatraju vodeći ekonomski indikator koji javnosti daje informacije o budućim povraćajima na bankarsku aktivu. Ako su povraćaji visoki, deponenti su potpuno voljni da drže svoja sredstva u banci. Međutim, ako su povraćaji dovoljno niski, oni će povući svoj novac anticipirajući niske povraćaje, što dovodi do krize.

Empirijski dokazi

Koji su empirijski dokazi o tome da li su juriši zasnovani na panici ili na fundamentalnim faktorima? Friedman and Schwarz (1963) napisali su obuhvatnu istoriju SAD od 1867. do 1960. godine. Između ostalog, oni tvrde da bankarske panike mogu da imaju žestoke efekte na realnu ekonomiju. U panikama iz ranih 1930-tih godina bankarske neprilike su se razvijale brzo i imale veliki efekat na output. Autori tvrde da su krize bile zasnovane na panici i kao dokaz nude odsustvo pogoršanja u relevantnim makroekonomskim vremenskim serijama pre kriza. Gorton (1988) pokazuje da su bankarske krize za vreme National Banking Era¹ bile predviđane vodećim indikatorom zasnovanom na obavezama firmi u stečaju. Ovi dokazi sugerišu da su bankarske krize zasnovane na fundamentalnim faktorima ili poslovnim ciklusima a ne na panici. Calomiris and Gorton (1991) pružaju širi izbor dokaza da su krize zasnovane na fundamentalnim faktorima a ne na panici. Wicker (1980, 1996) pokazuje da je uprkos odustva kolapsa u makroekonomskim serijama u SAD, u prve dve

od četiri krize u ranim 1930-tim godinama koje su identifikovali Friedman and Schwarz bilo velikih regionalnih šokova i pripisuju krize tim šokovima. Calomiris and Mason (2003) preduzimaju detaljnu ekonometrijsku studiju ove četiri krize koristeći širok krug podataka i zaključuju da su prve tri krize bile zasnovane na fundamentalnim faktorima dok je četvrta bila zasnovana na panici.

U svemu, podaci sugerišu da se u praksi mogu javiti obe vrste bankarskih kriza. Međutim, podaci za SAD u 19 veku i u ranim 1930-tim godinama sugerišu da su krize zasnovane na fundamentalnim faktorima od većeg značaja.

Tržišni nedostatak u modelima zasnovanim na fundamentalnim faktorima

Allen and Gale (2004a, 2007) razvijaju okvir generalne ravnoteže za razumevanje normativnih aspekata kriza. Ovaj model je reper za istraživanje svojstava uspešnosti finansijskih sistema. U obzir se uzima interakcija između banaka i tržišta. Tržišta su institucionalna u smislu da na njima banke i posrednici dele rizike i likvidnost. Pojedinci ne mogu direktno da pristupaju ovim tržištima, ali investiraju svoja sredstva u banke koje imaju pristup na njima. Zbog nedostatka široko prihvaćene teorije o selekciji ravnoteže, autori se usmeravaju na fundamentalne šokove kao pokretače finansijske krize - u obzir se uzimaju samo *bitne* krize. Drugim rečima, panike koje nisu neophodne, u smislu da postoji ravnoteža i bez panike, nisu uzete u obzir. Samo kada nema dobrih ravnoteža razmatraju se ravnoteže sa krizom.

Finansijski posrednici i tržišta imaju važnu ulogu u ovom modelu. Prvi pružaju obezbeđenje likvidnosti potrošačima protiv posebnih šokova likvidnosti, dok tržišta dozvoljavaju finansijskim posrednicima i njihovim deponentima da dele agregatnu likvidnost i povratne šokove.

¹ Federalne rezerve su osnovane 1914. godine da bi se rešili problemi bankarstva i novca koji su se javljali od građanskog rata (1860-1864). SAD nisu imale centralnu banku tokom perioda posle građanskog rata, koji je istoričarima ekonomije poznat kao National Banking Era. (Prim.prev.)

models of banking crises caused by aggregate risk. For example, Chari and Jagannathan (1988) focus on a signal extraction problem where part of the population observes a signal about future returns. Others must then try to deduce from observed withdrawals whether an unfavourable signal was received by this group or whether liquidity needs happen to be high. Chari and Jagannathan are able to show crises occur not only when the outlook is poor but also when liquidity needs turn out to be high.

Building on the empirical work of Gorton (1988) which determined that 19th century banking crises were predicted by leading economic indicators, Allen and Gale (1998) develop a model that is consistent with the business cycle view of the origins of banking crises. They assume that depositors can observe a leading economic indicator that provides public information about future bank asset returns. If there are high returns, depositors are quite willing to keep their funds in the bank. However, if the returns are sufficiently low, they will withdraw their money in anticipation of low returns, resulting in a crisis.

Empirical evidence

What is the empirical evidence concerning whether runs are panic-based or fundamental-based? Friedman and Schwartz (1963) have written a comprehensive monetary history of the United States from 1867 to 1960. Among other things, they argue that banking panics can have severe effects on the real economy. In the panics of the early 1930s, banking distress developed quickly and had a large effect on output. The authors argue that the crises were panic-based and offer as evidence the absence of downturns in the relevant macroeconomic time series prior to the crises. Gorton (1988) shows that banking crises in the National Banking Era¹ were predicted by a leading indicator based on liabilities of failed businesses. This evidence suggests banking crises are fundamental- or business cycle-related rather than panic-based. Calomiris and Gorton (1991) provide a wider

range of evidence that crises are fundamental- rather than panic-based. Wicker (1980, 1996) shows that, despite the absence of collapses in US national macroeconomic time series, in the first two of the four crises identified by Friedman and Schwartz in the early 1930s there were large regional shocks, and attributes the crises to these shocks. Calomiris and Mason (2003) undertake a detailed econometric study of the four crises using a broad range of data and conclude that the first three crises were fundamental-based while the fourth was panic-based.

Overall, the evidence thus suggests that both types of banking crisis can occur in practice. However, the evidence for the United States in the 19th century and for the early 1930s suggests that fundamental-based crises are the most important type.

The market failure in fundamental-based models

Allen and Gale (2004a, 2007) develop a general equilibrium framework for understanding the normative aspects of crises. The model is a benchmark for investigating the welfare properties of financial systems. The interaction of banks and markets is considered. The markets are institutional in the sense that they are for banks and intermediaries to share risks and liquidity. Individuals cannot directly access these markets, but invest their funds in banks that have access to them. Given the lack of a widely accepted theory of equilibrium selection, the authors focus on fundamental shocks as the driver of financial crises – only *essential* crises are considered. In other words, panics that are unnecessary, in the sense that an equilibrium without a panic also exists, are not taken into account. Only when there are no good equilibria are equilibria with crises considered.

Both financial intermediaries and markets play an important role in the model. The former provide liquidity insurance to consumers against idiosyncratic liquidity shocks, while

¹ The Federal Reserve was established in 1914 to remedy banking and currency problems that had been recurring since the Civil War. The country had no central bank during this period, which is known as the National Banking Era.

Za razumevanje tržišnih nedostataka koji mogu da pravdaju regulativu, ključnu ulogu imaju kompletna naspram nekompletnih tržišta i ugovora. Ako su finansijska tržišta kompletna, moguće je da posrednici ostvaruju hedžing za sve agregatne rizike na finansijskim tržištima. Kompletna tržišta obuhvataju državni kontingent Arrow hartija od vrednosti² ili njihov ekvivalent kao što su derivatne hartije od vrednosti ili dinamične mogućnosti za trgovinu. Nasuprot tome, nepotpuna tržišta znače da iznos potrošnje svakog mogućeg agregatnog stanja ne može da se nezavisno varira. Ako su ugovori između posrednika i potrošača kompletni, oni takođe mogu da budu prilagođeni na agregatne rizike. Nepotpun ugovor bi bio nešto kao dug gde otplata po ugovoru ne zavisi od agregatnog stanja. Pri tim definicijama, Allen and Gale (2002a) pokazuju sledeće rezultate.

Rezultat 1: kada su tržišta i ugovori kompletni, alokacija resursa je *podsticajno* efikasna.

Ovaj rezultat pruža značajan reper za okolnosti gde "nevidljiva ruka" Adama Smita radi uprkos prisustva asimetrije informacija. Kao i obično, potrebno je poređenje alokacije decentralizovanog tržišnog sistema sa alokacijom koju primenjuje centralni planer. Alokacija je podsticajno efikasna zbog toga što specifične šokove likvidnosti na deponente posrednici ne mogu direktno da opažaju u slučaju tržišta ili planer u slučaju direktne alokacije. Deponenti moraju da imaju korektne podsticaje da otkrivaju informacije ako je to potrebno radi efikasnosti alokacije. Otuda, koristi se koncept podsticajne efikasnosti a ne puna efikasnost.

U ovom idealnom svetu kompletnih tržišta i ugovora, tržište nema nedostatak. Dalje, finansijske krize se ne javljaju jer banke i drugi posrednici mogu da uravnotežavaju aktivu i pasivu državu po državu. U ovom slučaju nema potrebe za regulativom ili državnom intervencijom bilo koje vrste. To je analogno prvoj fundamentalnoj teoremi ekonomije blagostanja u kontekstu finansijskog posredovanja.

Do sada smo pretpostavljali kompletne ugovore između banaka i drugih posrednika i njihovih klijenata. Mnogi posmatrani ugovori u praksi između posrednika i klijenata kao što su ugovori o kreditu i depozitu nekompletni su. Međutim, čak i kada je tako, moguće je pokazati rezultat što se tiče efikasnosti.

Rezultat 2: kada su ugovori nekompletni a tržišta su kompletna, alokacija je ograničeno efikasna.

Ponovo, nevidljiva ruka tržišta deluje u smislu što planer ograničen da koristi nekompletne ugovore sa klijentima ne može da prođe bolje nego tržište pod uslovom da su finansijska tržišta kompletna. Štaviše, može se pokazati da u ravnoteži sa nekompletnim ugovorima mogu da se jave finansijske krize. Na primer, ako banka koristi ugovor o depozitu može da se javi bankarska kriza. Ovo pokazuje da krize nisu uvek loše. U nekim slučajevima one mogu da povećaju efektivne rezerve države za nepredviđene slučajeve i poboljšaju mogućnosti za deobu rizika i otuda alokaciju resursa. Naravno, nisu krize uvek ni dobre. Međutim, u nekim slučajevima mogu biti, naročito kada su finansijska tržišta kompletna a ugovori između posrednika i klijenata nekompletni.

Ponovo, nema tržišnog nedostatka i nema opravdanja za regulativu ili neku drugu vrstu intervencije. Ovo je drugi značajan reper. On pokazuje da neke krize mogu biti dobre. Dalje, mogućnost pojave krize ne opravdava uvek intervenciju. Kada smo već to rekli, međutim, postoji naravno drugi slučaj koji treba razmotriti: kada su finansijska tržišta nekompletna. Sada se okrećemo takvoj situaciji. Kao što ćemo videti, ovde zaista postoji nedostatak na tržištu. Sada krize mogu da budu loše i regulativa i druge forme intervencije imaju mogućnosti da poboljšaju alokaciju resursa.

Razlika između kompletnih i nekompletnih tržišta bitno određuje da li je finansijski sistem amortizer ili pojačivač šoka. Na kompletnim tržištima, on je amortizer šoka. Kompletnost dozvoljava da rizike efikasno snose svi. Na nekompletnim tržištima, međutim šokovi - čak i mali - mogu da se pojačaju i mogu nastati

² <http://cepa.newschool.edu/het/essays/sequence/spanning.htm>

markets allow financial intermediaries and their depositors to share aggregate liquidity and return shocks.

In understanding the market failures that can justify regulation, a key role is played by complete versus incomplete markets and contracts. If financial markets are complete, it is possible for intermediaries to hedge all aggregate risks in the financial markets. Complete markets involve state-contingent Arrow securities² or their equivalent in terms of derivative securities or dynamic trading opportunities. In contrast, incomplete markets mean that the amount of consumption in each possible aggregate state cannot be independently varied. If the contracts between intermediaries and consumers are complete, they can also be conditioned on aggregate risks. An incomplete contract would be something like debt where the payoff on the contract does not depend on the aggregate state. Given these definitions, Allen and Gale (2004a) show the following results.

Result 1: When markets are complete and contracts are complete, the allocation of resources is *incentive-efficient*.

The result provides an important benchmark of circumstances where Adam Smith's "invisible hand" works despite the presence of asymmetric information. As usual, it involves comparing the allocation of a decentralised market system with an allocation implemented by a central planner. The allocation is incentive-efficient because the idiosyncratic liquidity shocks to depositors cannot be directly observed by the intermediaries in the case of the market, or the planner in the case of direct allocation. The depositors must have the correct incentives to reveal the information if this is necessary in the efficient allocation. Hence, the notion of incentive efficiency rather than full efficiency is used.

In this ideal world of complete markets and complete contracts, there is no market failure. Moreover, financial crises do not occur because banks and other intermediaries can balance assets and liabilities state by state. In this case, there is no need for regulation or government

intervention of any kind. It is the analog to the first fundamental theorem of welfare economics in the context of financial intermediation.

So far we have assumed complete contracts between banks and other intermediaries and their customers. Many contracts observed in practice between intermediaries and consumers such as debt and deposit contracts are incomplete. However, even if this is the case, it is possible to show a result concerning efficiency.

Result 2: When contracts are incomplete and markets are complete, the allocation is *constrained efficient*.

Again, the invisible hand of the market works in the sense that a planner constrained to use incomplete contracts with consumers could not do any better than the market provided financial markets are complete. What is more, it can be shown that in the equilibrium with incomplete contracts there can be financial crises. For example, if a bank uses a deposit contract, there can be a banking crisis. This demonstrates that crises are not always bad. In some cases they can increase effective state contingencies and improve the possibilities for risk-sharing and hence the allocation of resources. Of course, nor are crises always good; however, in some cases they can be, in particular when financial markets are complete and contracts between intermediaries and consumers are incomplete.

Once again, there is no market failure and no justification for regulation or any other kind of intervention. This is another important benchmark. It shows that some crises can be good. Moreover, the possibility of crisis does not always justify intervention. Having said that, however, there is of course another case to be considered: when financial markets are incomplete. We turn to this situation next. As we shall see, there is indeed a market failure here. Now crises can be bad and regulations and other forms of intervention have the possibility of improving the allocation of resources.

The difference between complete and incomplete markets essentially determines whether the financial system is a shock absorber

² <http://cepa.newschool.edu/het/essays/sequence/spanning.htm>

značajne neefikasnosti.

Nekompletna tržišta

Dva rezultata u prethodnoj sekciji pokazuju da ako postoje kompletna tržišta onda nema tržišnih nedostataka. Ovo važi podjednako kada su ugovori između banaka i drugih posrednika kompletni ili nekompletni. Naravno, uspeh je viši sa kompletnim nego sa nekompletnim ugovorima. Na nekompletnim tržištima, međutim, proizilazi da zaista postoji tržišni nedostatak. Ovo može da uzme različite forme, kao što ćemo videti: finansijsku krhkost, zarazu ili mehure cena aktive.

Suštinski problem sa nekompletnim tržištima je u tome što je obezbeđenje likvidnosti neefikasno. Priroda upravljanja rizicima, da se obezbedi da banka ili posrednik imaju potreban iznos likvidnosti, znatno se menja u poređenju sa slučajem kompletnih tržišta. Kada su tržišta kompletna moguće je koristiti Arrow hartije od vrednosti ili podjednako pun set derivata ili dinamične strategije trgovine da bi se obezbedila likvidnost kada je potrebna. Sistem cena obezbeđuje da je adekvatna likvidnost data u svakoj državi i da su cene određene na odgovarajući način od države do države. Da bi se razumelo kako ovo funkcioniše, od pomoći je da se kompletna tržišta konceptijski prikažu u smislu Arrow hartija od vrednosti kojima se trguje početnog dana i isplaćuju u određenoj državi. U ovom slučaju, banke i drugi posrednici kupuju likvidnost u državama gde je oskudna prodajući likvidnost u državama gde je za njih u obilju. Kompletna tržišta omogućavaju podelu rizika i osiguranja. Finansijski sistem deluje kao amortizer šoka. Ako se rizik poveća, on se efikasno širi kompletnim tržištima.

Nasuprot tome, kada su tržišta nekompletna, likvidnost se postiže prodajom aktive na tržištu kada je likvidnost potrebna. Cene aktive određuje raspoloživa likvidnost, to jest, "novac na tržištu". Neophodno je da ljudi drže likvidnost i budu spremni da kupuju aktivu kada se prodaje. Ovi dobavljači likvidnosti više ne dobijaju kompenzaciju za troškove obezbeđenja likvidnosti državu po državu. Umesto toga, troškovi moraju da se odrede kao prosek za sve države i tu leži problem.

Provajderi likvidnosti imaju alternativu

da investiraju u produktivnu dugoročnu aktivu. Postoji oportunitetni trošak u vezi sa držanjem likvidnosti jer ovo ima niži povraćaj u poređenju sa produktivnom dugoročnom aktivom. Da bi ljudi bili voljni da pružaju likvidnost, oni moraju da ostvaruju profit u nekim državama. Ako niko ne drži likvidnost, onda kada banke i posrednici prodaju aktivu da pribave likvidnost njena cena se urušava na nulu. Ovo bi pružilo podsticaj ljudima da drže likvidnost jer mogu da kupe aktivu jeftino. U ravnoteži, cene će otići na nivo na kome je profit u državama u kojima banke i posrednici prodaju dovoljan da kompenzuje provajdere likvidnosti za to što ne koriste likvidnost - i jednostavno snose oportunitetni trošak što je drže - u drugim državama. Drugim rečima, cene su niske u državama gde je bankama i posrednicima potrebna likvidnost. Ali to je upravo pogrešno vreme sa gledišta efikasnosti da dođe do transfera od banaka i posrednika kojima je potrebna likvidnost do provajdera likvidnosti. Postoji, u stvari, negativno osiguranje i suboptimalno deljenje rizika. Allen and Carletti (2006, 2007) objašnjavaju detaljno kako funkcioniše ovaj mehanizam utvrđivanja cena.

Na nekompletnim tržištima, finansijski sistem deluje kao pojačivač. Veliki šokovi mogu da vode do veće volatilnosti cena, što može uzrokovati znatne probleme u smislu bankrotstava i tako dalje.

Da sumiramo, kada su tržišta nekompletna cene aktive moraju da budu volatilne da bi pružile podsticaj za obezbeđenje likvidnosti. Ova volatilnost cena aktive može da vodi u skupe i neefikasne krize. Postoji tržišni nedostatak koji potencijalno daje opravdanje za regulativu i druge vrste intervencija da bi se unapredila alokacija resursa.

Simptomi tržišnog nedostatka

Problemi obezbeđenja likvidnosti koji nastaju zbog tržišnih nedostataka mogu da rezultiraju jednim brojem fenomena koji su povezani sa finansijskim krizama. To su finansijska krhkost, zaraza i mehure cena aktive. Finansijska krhkost je kada mali šok može da ima veliki efekat i vodi u krizu. Kod zaraze, šok iz jednog regiona može da se proširi na

or an amplifier. With complete markets, it is a shock absorber. The completeness allows risks to be borne efficiently by everyone. With incomplete markets, however, shocks – even very small ones – can be amplified and significant inefficiencies can result.

Incomplete markets

The two results in the previous section show that if there are complete markets then there is no market failure. This is true whether contracts between banks and other intermediaries are complete or incomplete. Of course, welfare is usually higher with complete contracts than incomplete contracts, but there is no market failure. With incomplete markets, however, it turns out there is indeed a market failure. This can take a number of different forms, as we shall see: financial fragility, contagion or asset price bubbles.

The essential problem with incomplete markets is that liquidity provision is inefficient. The nature of risk management, to ensure that the bank or intermediary has the correct amount of liquidity, changes significantly in comparison to the case of complete markets. When markets are complete, it is possible to use Arrow securities or equivalently a full set of derivatives or dynamic trading strategies to ensure liquidity is received when it is needed. The price system ensures adequate liquidity is provided in every state and is priced properly state by state. To understand how this works, it is helpful to conceptualise complete markets in terms of Arrow securities that are traded at the initial date and pay off in a particular state. In this case, banks and other intermediaries buy liquidity in states where it is scarce by selling liquidity in states where it is plentiful for them. The complete markets allow risksharing and insurance. The financial system acts as a shock absorber. If risk is increased, it is spread around efficiently by the complete markets.

In contrast, when markets are incomplete, liquidity provision is achieved by selling assets in the market when the liquidity is required. Asset prices are determined by the available liquidity, that is, by the “cash in the market”. It is necessary for people to hold liquidity and stand ready to buy assets when they are

sold. These suppliers of liquidity are no longer compensated for the cost of providing liquidity state by state. Instead, the cost must be made up on average across all states, and this is where the problem lies.

The providers of liquidity have the alternative of investing in a productive long asset. There is an opportunity cost associated with holding liquidity since this has a lower return than the productive long asset. In order for people to be willing to supply liquidity, they must be able to make a profit in some states. If no one held liquidity, then when banks and intermediaries sold assets to acquire liquidity their price would collapse to zero. This would provide an incentive for people to hold liquidity since they can acquire assets cheaply. In equilibrium, prices will be bid up to the level at which the profit in the states where banks and intermediaries sell is sufficient to compensate the providers of liquidity for not using liquidity – and simply bearing the opportunity cost of holding it – in other states. In other words, prices are low in the states where banks and intermediaries need liquidity. But this is exactly the wrong time from an efficiency point of view for there to be a transfer from banks and intermediaries that need liquidity to the providers of liquidity. There is, in effect, negative insurance and suboptimal risk-sharing. Allen and Carletti (2006, 2007) explain in detail how this pricing mechanism works.

With incomplete markets, the financial system thus acts as an amplifier. Large shocks can lead to more price volatility, which can cause significant problems in terms of bankruptcy and so forth.

To summarise, when markets are incomplete asset prices must be volatile to provide incentives for liquidity provision. This asset price volatility can lead to costly and inefficient crises. There is a market failure that potentially provides the justification for regulation and other kinds of intervention to improve the allocation of resources.

The symptoms of market failure

The problems in liquidity provision that arise from incomplete markets can result in a

SAMOISPUNJAVAJUĆE PROROČANSTVO

Samoispunjavajuće proročanstvo je predviđanje koje direktno ili indirektno utiče na to da bude istinito. Mada se primeri takvih proročanstava mogu naći u literaturi još kod starih Grka i u staroj Indiji, sociologu 20. veka, Robertu K. Mertonu, se pripisuje da je skovao izraz "samoostvarivo proročanstvo" i formalizovao njegovu strukturu i posledice. U svojoj knjizi *Social Theory and Social Structure* (1968) Merton daje karakteristiku samoispunjavajućeg proročanstva. "Samoispunjavajuće proročanstvo je na početku netačna definicija situacije koja izaziva novo ponašanje na osnovu koga prvobitno netačna koncepcija postaje istinita. Ova prividna istinitost samoispunjavajućeg proročanstva perpetuiira vladavinu greške. Prorok će navesti stvarni tok događaja kao dokaz da je bio u pravu od samog početka." Drugim rečima - proročanstvo objavljeno kao istina kada to nije - može da utiče na ljude u dovoljnoj meri, kroz strah ili logičku konfuziju, da njihovo reagovanje na kraju ispunji lažno proročanstvo.

Koncept koji je dao Robert K. Merton proizilazi iz **Tomasove teoreme** koja navodi da:

"Ako ljudi definišu situacije kao realne one su realne po svojim posledicama."

Prema Tomasu, nije značajno kako ljudi reaguju na situacije u kojima su, već je prvenstveno važan način na koji percipiraju situacije i na značenje koje daju tim situacijama. Otuda, njihovo ponašanje određuje delom njihova percepcija i značenje koje pripisuju situacijama u kojima se nalaze a ne samim situacijama. Kada ljudi uvere sebe da situacija ima određeno značenje, nezavisno od toga da li je to tako, preduzeće vrlo realne aktivnosti kao posledicu.

Merton je ovaj koncept primenio na novije društvene fenomene. U navedenoj knjizi daje primer izmišljene banke Cartwrighta Millingwilla. To je tipična banka i Millingwill je vodi pošteno i sasvim valjano. Zato kao sve banke, ona ima određenu likvidnu aktivu (novac) ali veći deo njene aktive investiran je u razne poslove. Jednog dana veći broj klijenata dođe u banku odjednom - tačan razlog se nikad ne sazna. Klijenti, videći toliko mnogo ljudi u banci, počinju da brinu. Lažne glasine se šire o tome da nešto nije u redu sa bankom i sve više klijenata juriša na banku u pokušaju da dobiju nešto od svog novca dok to još uvek mogu. Broj klijenata pred bankom se povećava kao i njihova uznemirenost i briga što sa svoje strane pojačava lažne glasine o nesolventnosti banke i predstojećem stečaju, čineći da sve više klijenata dolazi pokušavajući da povuče svoj novac. Na početku dana - koji je poslednji dan za Millingwillovu banku - banka nije bila nesolventna. Ali, glasine o nesolventnosti su izazvale iznenađan zahtev suviše mnogo klijenata za povlačenje, koji nisu mogli da se ispune, dovodeći banku do nesolventnosti i objavljivanja bankrotstva. Merton zaključuje ovaj primer sledećom analizom:

Ova parabola nam govori da definicija situacije koju daje publika (proročanstva ili predviđanja) postaju integralni deo situacije i na taj način utiču na dalje događaje. Ovo je karakteristično za ljudske poslove i nema ga u

prirodi koju nisu takle ljudske ruke. Predviđanja o povratku Halejeve komete ne utiču na njenu orbitu. Ali glasine o nesolventnosti Millingwillove banke jesu uticale na stvarni ishod. Proročanstvo kolapsa dovelo je do svog sopstvenog ispunjenja.

Merton zaključuje da je jedini način da se prekine ciklus samoispunjivog proročanstva redefinisane propozicije na kojima su njegove lažne pretpostavke prvobitno zasnovane.



SELF-FULFILLING PROPHECY

A **self-fulfilling prophecy** is a prediction that directly or indirectly causes itself to become true. Although examples of such prophecies can be found in literature as far back as ancient Greece and ancient India, it is 20th-century sociologist Robert K. Merton who is credited with coining the expression “self-fulfilling prophecy” and formalizing its structure and consequences. In his book *Social Theory and Social Structure*, Merton gives as a feature of the self-fulfilling prophecy:

“The self-fulfilling prophecy is, in the beginning, a *false* definition of the situation evoking a new behaviour which makes the original false conception come “true”. This specious validity of the self-fulfilling prophecy perpetuates a reign of error. For the prophet will cite the actual course of events as proof that he was right from the very beginning.”

In other words, a prophecy declared as truth when it is actually false may sufficiently influence people, either through fear or logical confusion, so that their reactions ultimately fulfill the once-false prophecy.

Robert K. Merton’s concept of the self-fulfilling prophecy stems from the Thomas theorem, which states that:

“If men define situations as real, they are real in their consequences.”

According to Thomas, people do not react only to the situations they are in, but also, and often primarily, to the way they perceive the situations and to the meaning they assign to these situations. Therefore, their behavior is determined in part by their perception and the meaning they ascribe to the situations they are in, rather than by the situations themselves. Once people convince themselves that a situation really has a certain meaning, regardless of whether it actually does, they will take very real actions in consequence.

Merton took the concept a step further and applied it to recent social phenomena. In his book *Social Theory and Social Structure*, he conceives of a bank run at the fictional bank of Cartwright Millingville. It is a typical bank, and Millingville has run it honestly and quite properly. As a result, like all banks, it has some liquid assets (cash), but most of its assets are invested in various ventures. Then one day, a large number of customers come to the bank at once—the exact reason is never made clear. Customers, seeing so many others at the bank, begin to worry. False rumors spread that something is wrong with the bank and more customers rush to the bank to try to get some of their money out while they still can. The number of customers at the bank increases, as does their annoyance and excitement, which in turn fuels the false rumors of the bank’s insolvency and upcoming bankruptcy, causing more customers to come and try to withdraw their money. At the beginning of the day—the last one for Millingville’s bank—the bank was not insolvent. But the rumor of insolvency caused a sudden demand of withdrawal of too many customers, which could not be answered, causing the bank to become insolvent and declare bankruptcy. Merton concludes this example with the following analysis:

“The parable tells us that public definitions of a situation (prophecies or predictions) become an integral part of the situation and thus affect subsequent developments. This is peculiar to human affairs. It is not found in the world of nature, untouched by human hands. Predictions of the return of Halley’s comet do not influence its orbit. But the rumored insolvency of Millingville’s bank did affect the actual outcome. The prophecy of collapse led to its own fulfillment.”

Merton concluded that the only way to break the cycle of self-fulfilling prophecy is by redefining the propositions on which its false assumptions are originally based.



druge regione i da ima poguban efekat. Kod mehura cena aktive, neefikasno obezbeđivanje likvidnosti na tržištu može da bude pojačano neefikasnim obezbeđenjem likvidnosti od strane centralne banke, što može dovesti do udaljavanja cena aktive od fundamentalnih faktora. Sada ćemo razmotriti svaki od ovih simptoma tržišnih nedostataka.

Finansijska krhkost

Ima mnogo istorijskih primera kada su mali šokovi imali značajan uticaj na finansijski sistem. Na primer, Kindleberger (1978, pp 107-8) tvrdi da neposredni uzrok za finansijsku krizu:

"... može biti trivijalan, stečaj, samoubistvo, bekstvo, obelodanjenje, odbijanje kredita istom zajmoprimcu, neka promena u proceni koja nagoni značajnog učesnika na rasprodaju. Cene padnu. Očekivanja se preokrenu. Promena dobija brzinu. U meri u kojoj su spekulatori puni novca iz uzetih kredita, pad cena vodi daljem pozivu za marginu ili gotovinu i daljoj likvidaciji. Sa daljim padom cena, bankarski krediti ne donose više kamatu i jedna ili više trgovinskih firmi, banaka, diskontnih kuća ili brokerskih firmi idu u stečaj. Sam kreditni sistem izgleda nesiguran i trka za likvidnost se nastavlja."

Nedavni primeri daju pravu ilustraciju toga kako mali događaji mogu da prouzrokuju velike probleme. Avgusta 1998. godine, ruska vlada je objavila moratorijum na oko 281 milijardu rubalja (\$13,5 milijardi) državnog duga. Uprkos malom obimu neizvršenja, to je otpočelo globalnu krizu i izazvalo ekstremnu volatilnost na mnogim finansijskim tržištima. Hedž fond Long Term Capital Management (LTCM) došao je pod izuzetan pritisak. Uprkos tome što je LTCM mali u odnosu na globalni finansijski sistem, Federal Reserve Bank of New York bila je dovoljno zabrinuta oko potencijala za krizu ako bi LTCM otišao u stečaj da je pomogla organizovanje grupe privatnih banaka da kupe taj hedž fond i likvidiraju njegove pozicije na redovan način. Zabrinutost Fed-a bila je da bi LTCM odlaskom u stečaj morao da likvidira svu svoju aktivu na brzinu. LTCM je imao mnoge velike pozicije na prilično nelikvidnim tržištima. U takvim okolnostima, cene mogu jako da padnu ako se ubrzano prodaju veliki iznosi. Ovo može da pritisne druge institucije,

koje bi bile primorane da i same prodaju što bi dalje povećavalo problem, kako Kindleberger opisuje u gornjem pasusu.

Allen and Gale (2004b) prikazuju kako interakcija finansijskih posrednika i tržišta može da vodi finansijskoj krhkosti. Mali događaji, kao što su mali šokovi likvidnosti, mogu da imaju veliki uticaj na finansijski sistem zbog interakcije između banaka i tržišta. Uloga likvidnosti je ključna. Da bi finansijski posrednici imali podsticaj da pruže likvidnost tržištu, cene aktive moraju da budu volatilne. Posrednici koji su na početku slični mogu da primenjuju radikalno različite strategije u pogledu vrsta aktive u koje investiraju i u pogledu rizika od neizvršenja. Interakcija banaka i tržišta pruža objašnjenje za sistemske ili krize u celokupnoj ekonomiji, za razliku od modela, kao što su modeli Bryanta (1980) i Diamonda and Dybviga (1983), koji objašnjavaju pojedinačne juriše na banke.

Kao što je opisano u prethodnoj sekciji, centralna ideja je da kada su tržišta nekompletna finansijske institucije su primorane da prodaju aktivu da bi došle do likvidnosti. Zato što će ponuda i tražnja za likvidnošću biti neelastične na kratak rok, mali stepen ukupne neizvesnosti može da uzrokuje velike fluktuacije cena aktive. Držanje likvidnosti obuhvata oportunitetne troškove koje dobavljači likvidnosti mogu da pokriju kupovinom aktive po cenama kod vatrogasne prodaje u nekim državama u svetu, tako da će privatno obezbeđivanje likvidnosti koje pružaju arbitražeri biti uvek neadekvatno za obezbeđenje kompletne stabilnosti cena aktive. Zbog toga, mali šokovi mogu da izazovu znatnu volatilnost cena aktive. Ako je volatilnost dovoljno velika, banke mogu da nađu da je nemoguće da odgovore svojim fiksnim obavezama i onda će se kriza pojaviti u svojoj punoj snazi.

Zaraza

Finansijska zaraza se odnosi na proces u kome se kriza koja počinje u jednom regionu, zemlji ili industriji širi na ekonomski povezan region, zemlju ili drugu industriju. Ima jedan broj razloga zbog kojih se može pojaviti zaraza. Na primer, jedan osnov za zarazu su infomacije (videti na pr. Kodres and Pritsker (2002), Calvo and Mendoza (2000a, 200b) i Calvo (2002).

number of phenomena that are associated with financial crises. These are financial fragility, contagion and asset price bubbles. Financial fragility is when a small shock can have a large effect and lead to a crisis. With contagion, a shock in one region can spread to others and have a damaging effect. With asset price bubbles, the inefficient provision of liquidity by the market can be exacerbated by the inefficient provision of liquidity by the central bank, which can result in deviations of asset prices from fundamentals. We consider each of these symptoms of market failure in turn.

Financial fragility

There are many historical cases where small shocks have had a significant impact on the financial system. For example, Kindleberger (1978, pp 107–8) argues that the immediate cause of a financial crisis:

“...may be trivial, a bankruptcy, a suicide, a flight, a revelation, a refusal of credit to some borrower, some change of view which leads a significant actor to unload. Prices fall. Expectations are reversed. The movement picks up speed. To the extent that speculators are leveraged with borrowed money, the decline in prices leads to further calls on them for margin or cash, and to further liquidation. As prices fall further, bank loans turn sour, and one or more mercantile houses, banks, discount houses, or brokerages fail. The credit system itself appears shaky and the race for liquidity is on”.

Recent examples provide a stark illustration of how small events can cause large problems. In August 1998, the Russian government announced a moratorium on about 281 billion roubles (\$13.5 billion) of government debt. Despite the small scale of the default, it triggered a global crisis and caused extreme volatility in many financial markets. The hedge fund Long Term Capital Management (LTCM) came under extreme pressure. Despite LTCM’s small size in relation to the global financial system, the Federal Reserve Bank of New York was sufficiently worried about the potential for a crisis if LTCM were to go bankrupt that it helped arrange for a group of private banks to purchase the hedge fund and liquidate its positions in an orderly way. The Fed’s concern was that if LTCM went bankrupt, it would be forced to liquidate all its assets

quickly. LTCM held many large positions in fairly illiquid markets. In such circumstances, prices might fall a long way if large amounts were sold quickly. This could put strain on other institutions, which would be forced to sell in turn, and this would further exacerbate the problem, as Kindleberger describes in the passage above.

Allen and Gale (2004b) show how the interaction of financial intermediaries and markets can lead to financial fragility. Small events, such as minor liquidity shocks, can have a large impact on the financial system because of the interaction of banks and markets. The role of liquidity is crucial. In order for financial intermediaries to have an incentive to provide liquidity to a market, asset prices must be volatile. Intermediaries that are initially similar may pursue radically different strategies, with respect to both the types of assets in which they invest and their risk of default. The interaction of banks and markets provides an explanation for systemic or economy-wide crises, as distinct from models, such as those of Bryant (1980) and Diamond and Dybvig (1983), that explain individual bank runs.

As described in the previous section, the central idea is that when markets are incomplete financial institutions are forced to sell assets in order to obtain liquidity. Because the supply of and demand for liquidity are likely to be inelastic in the short run, a small degree of aggregate uncertainty can cause large fluctuations in asset prices. Holding liquidity involves an opportunity cost which the suppliers of liquidity can only recoup by buying assets at fire sale prices in some states of the world, so the private provision of liquidity by arbitrageurs will always be inadequate to ensure complete asset price stability. As a result, small shocks can cause significant asset price volatility. If the volatility is severe enough, banks may find it impossible to meet their fixed commitments and a full-blown crisis will occur.

Contagion

Financial contagion refers to the process by which a crisis that begins in one region, country or industry spreads to an economically linked region or country or another industry. There are

Ovde se bavimo drugom vrstom zaraze koja proizilazi iz nekompletnosti, koja je opisana u Allen and Gale (2000a). Ponovo, problem se odnosi na obezbeđenje likvidnosti, ali na nešto drugačiji način od onog koji smo diskutovali u kontekstu finansijske krhkosti. Mogućnost ove vrste zaraze nastaje iz preklapanja potraživanja koja različiti regioni ili sektori bankarskog sistema imaju jedan prema drugom. Kada jedan region pogodi bankarska kriza drugi pretrpe gubitak zato što njihova potraživanja prema uznemirenom regionu gube vrednost. Ako je ovaj efekat preliivanja dovoljno snažan, on može izazvati krizu u susednim regionima. U ekstremnim slučajevima, kriza prelazi iz regiona u region, da bi na kraju imala uticaj na mnogo širi prostor nego što je onaj na kome je nastala početna kriza.

Pretpostavimo da se ekonomija sastoji od jednog broja regiona. Broj ranih i kasnih potrošača u svakom regionu fluktuiraju nepodudarno, ali ukupna tražnja za likvidnošću je konstantna. Ovo omogućava međuregionalno osiguranje tako što regioni sa suficitom pružaju likvidnost onima gde je nestašica. Jedan od načina da se organizuje pružanje osiguranja je kroz razmenu međubankarskih depozita. Recimo da region A ima veliki broj ranih potrošača kada region B ima mali broj i obrnuto. Pošto su A i B u drugim stvarima identični, njihovi depoziti su perfektni substituti. Banke razmenjuju depozite na prvi datum, pre nego uoče šokove likvidnosti. Ako region A ima natprosečni broj ranih potrošača na datum 1, onda banke u A mogu da izvršavaju svoje obaveze likvidiranjem nekih od svojih depozita u bankama regiona B. Region B je zadovoljan da izađe u susret, jer ima višak likvidnosti, u formi kratkoročne aktive. Na završni datum, proces se preokreće, pošto banke B likvidiraju depozite koje drže u A da bi odgovorile natprosečnoj tražnji kasnih potrošača u regionu B.

Međuregionalno unakrsno držanje depozita dobro funkcioniše sve dok ima dovoljno likvidnosti u bankarskom sistemu kao celini. Ako postoji ekscesna tražnja za likvidnošću, međutim, finansijske veze nastale na ovim unakrsnim holdinzima mogu da postanu katastrofa. Mada je unakrsno držanje depozita korisno za realokaciju likvidnosti unutar bankarskog sistema, ono ne može da poveća

ukupan iznos likvidnosti. Ako je tražnja potrošača širom ekonomije veća od raspoložive kratkoročne aktive, jedini način da se obezbedi veća potrošnja je likvidirati dugoročnu aktivu. U ovom slučaju, likvidacija se odnosi na tehnološku ili fizičku likvidaciju a ne na prodaju aktive na tržištu. Postoji granica do koje se može sprovesti likvidacija bez izazivanja juriša na banke, međutim, jer ako inicijalni šok zahteva više od ovog bafera, biće juriša i banke će biti naterane u bankrotstvo. Banke koje drže depozite u banci u stečaju pretrpeće kapitalni gubitak, koji im može onemogućiti da izvršavaju svoje obaveze pružanja likvidnosti u svom regionu. Tako, ono što je počelo kao finansijska kriza u jednom regionu širi se zarazom na druge regione zbog unakrsnog držanja depozita.

Da li se finansijska kriza širi zavisi u suštini od šeme međupovezanosti koju je stvorilo unakrsno držanje depozita. Za međubankarsku mrežu se kaže da je kompletna ako je svaki region povezan sa svim drugim regionima a da je nekompletna ako je svaki region povezan sa malim brojem drugih regiona. U kompletnoj mreži, iznos međubankarskih depozita koje drži bilo koja banka ravnomerno su raspoređeni na veliki broj banaka. Kao rezultat, inicijalni impuls finansijske krize u jednom regionu može da bude prigušen. Kod nekompletne mreže, na drugoj strani, inicijalni impuls finansijske krize koncentrisan je na mali broj susednih regiona, pa je rezultat takav da i oni lako podlegnu krizi. Čim pojedini region bude pogođen krizom on brzo krene u prevremeno likvidiranje dugoročne aktive, uz konsekvantan gubitak vrednosti, tako da pre toga nepogođeni regioni i sami dođu u poziciju da budu pogođeni.

Važno je napomenuti ulogu problema “slobodnog jahača” u objašnjenju procesa zaraze. Unakrsno držanje depozita korisno je za redistribuciju likvidnosti, ali ono ne stvara likvidnost. Zato kada ima ekscesne tražnje za likvidnošću u ekonomiji kao celini, svaka banka pokušava da odgovori eksternim zahtevima za likvidnošću povlačenjem svojih depozita iz druge banke. Drugim rečima, svaka banka pokušava da prebaci odgovornost na drugu. Rezultat je da svi međubankarski depoziti nestaju i niko ne dobija dodatnu likvidnost.

Jedino rešenje za globalnu nestašicu

a number of reasons contagion can occur. For example, one basis for contagion is information (see eg Kodres and Pritsker (2002), Calvo and Mendoza (2000a, 2000b) and Calvo (2002)). Here we focus on a second type of contagion which is due to incompleteness, described in Allen and Gale (2000a). Again, the problem is related to liquidity provision, but in a somewhat different way than that discussed in the context of financial fragility. The possibility of this kind of contagion arises from the overlapping claims that different regions or sectors of the banking system have on one another. When one region suffers a bank crisis, the others suffer a loss because their claims on the troubled region fall in value. If this spillover effect is strong enough, it can cause a crisis in adjacent regions. In extreme cases, the crisis passes from region to region, eventually having an impact on a much larger area than the one in which the initial crisis occurred.

Suppose the economy consists of a number of regions. The number of early and late consumers in each region fluctuates randomly, but the aggregate demand for liquidity is constant. This allows for interregional insurance as regions with liquidity surpluses provide liquidity for those with shortages. One way to organise the provision of insurance is through the exchange of interbank deposits. Suppose that region A has a large number of early consumers when region B has a low number, and vice versa. Since A and B are otherwise identical, their deposits are perfect substitutes. The banks exchange deposits at the first date, before they observe the liquidity shocks. If region A has a higher than average number of early consumers at date 1, then banks in A can meet their obligations by liquidating some of their deposits in the banks of region B. Region B is happy to oblige, because it has an excess supply of liquidity, in the form of the short asset. At the final date, the process is reversed, as banks in B liquidate the deposits they hold in A to meet the above average demand from late consumers in region B.

Interregional cross-holdings of deposits work well as long as there is enough liquidity in the banking system as a whole. If there is an excess demand for liquidity, however, the financial linkages caused by these cross-

holdings can turn out to be a disaster. While cross-holdings of deposits are useful for reallocating liquidity within the banking system, they cannot increase the total amount of liquidity. If the economy-wide demand from consumers is greater than the stock of the short asset, the only way to provide more consumption is to liquidate the long asset. In this case, liquidation refers to technological or physical liquidation rather than selling the asset in a market. There is a limit to how much can be liquidated without provoking a run on the bank, however, so if the initial shock requires more than this buffer, there will be a run and the bank will be forced into bankruptcy. Banks holding deposits in the defaulting bank will suffer a capital loss, which may make it impossible for them to meet their commitments to provide liquidity in their region. Thus, what began as a financial crisis in one region will spread by contagion to other regions because of the cross-holdings of deposits.

Whether the financial crisis does spread depends crucially on the pattern of interconnectedness generated by the cross-holdings of deposits. The interbank network is said to be complete if each region is connected to all the other regions and incomplete if each region is connected with a small number of others. In a complete network, the amount of interbank deposits that any bank holds is spread evenly over a large number of banks. As a result, the initial impact of a financial crisis in one region may be attenuated. In an incomplete network, on the other hand, the initial impact of the financial crisis is concentrated in the small number of neighbouring regions, with the result that they easily succumb to the crisis too. As each region is affected by the crisis, it prompts premature liquidation of long assets, with a consequent loss of value, so that previously unaffected regions find that they are also affected.

It is important to note the role of a free rider problem in explaining the process of contagion. Cross-holdings of deposits are useful for redistributing liquidity, but they do not create it. So when there is excess demand for liquidity in the economy as a whole, each bank attempts to meet external demands for liquidity by drawing down its deposits in

likvidnosti (kada povlačenja premaše kratkoročnu aktivu) jeste da se fizički likvidira dugoročna aktiva. Svaka banka ima ograničeni bufer do koga može doći fizičkim likvidiranjem dugoročne aktive. Ako se taj bufer premaši banka mora u stečaj. Ovo je ključ za razumevanje razlike između zaraze u kompletnoj i nekompletnoj mreži. Kada je mreža kompletna, banke u uznemirenom regionu imaju direktna potraživanja prema bankama u svim drugim regionima. Svaki region podnese mali udar (fizički likvidira mali iznos dugoročne aktive) i nema potrebe za globalnom krizom. Kada je mreža nekompletna, banke u uznemirenom regionu imaju direktna potraživanja samo prema bankama u susednim regionima. Banke u drugim regionima ne moraju da likvidiraju dugoročnu aktivu dok se ne nađu na prednjoj liniji zaraze. U tom momentu, suviše im je kasno da se spasavaju.

Ima jedan broj načina na koji zaraza nastaje. Na primer, Allen and Carletti (2006) analiziraju kako finansijske inovacije mogu da stvore zarazu kroz sektore i umanje efekat u odnosu na autarkično rešenje. Oni se usmeravaju na strukturu šokova likvidnosti koji pogađaju bankarski sektor kao glavni mehanizam za generisanje zaraze. Nasuprot tome, Allen and Carletti (2007) usmeravaju se na uticaj različitih računovodstvenih metoda i pokazuju da računovodstvo valorizovanja prema tržištu može voditi u zarazu u situacijama u kojima računovodstvene vrednosti zasnovane na istorijskim troškovima to ne čine.

Mehuri

Ideja da je raspoloživ iznos likvidnosti važan faktor u određivanju cena aktive ima dugu istoriju. Pored likvidnosti koju pruža tržište, likvidnost u obliku novca i kredita koju pruža centralna banka takođe ima važnu ulogu. Ovde se bavimo tim aspektom obezbeđenja likvidnosti. U svom opisu istorijskih mehurova, Kindleberger (1978; p 54) naglašava ulogu tog faktora: "Spekulativne manije dobijaju ubrzanje kroz ekspanziju novca i kredita ili, možda, u nekim slučajevima, počinju zbog inicijalne ekspanzije novca i kredita."

U mnogo nedavnih slučajeva kada su cene aktive rasle a onda dramatično padale, pokazuje se se da je ekspanzija kredita nakon finansijske



Međuregionalno unakrsno držanje depozita dobro funkcioniše sve dok ima dovoljno likvidnosti u bankarskom sistemu kao celini. Ako postoji ekscesna tražnja za likvidnošću, međutim, finansijske veze nastale na ovim unakrsnim holdinzima mogu da postanu katastrofa.



another bank. In other words, each bank tries to “pass the buck” to another. The result is that all the interbank deposits disappear and no one gets any additional liquidity.

The only solution to a global shortage of liquidity (when withdrawals exceed short assets) is to physically liquidate long assets. Each bank has a limited buffer that it can access by physically liquidating the long asset. If this buffer is exceeded, the bank must fail. This is the key to understanding the difference between contagion in complete and incomplete networks. When the network is complete, banks in the troubled region have direct claims on banks in every other region. Every region takes a small hit (physically liquidates a small amount of the long asset), and there is no need for a global crisis. When the network is incomplete, banks in the troubled region have a direct claim only on the banks in adjacent regions. The banks in other regions are not required to liquidate the long asset until they find themselves on the front line of the contagion. At that point, it is too late for them to save themselves.

There are a number of other ways contagion can occur. For example, Allen and Carletti (2006) analyse how financial innovation can create contagion across sectors and lower welfare relative to the autarky solution. They focus on the structure of liquidity shocks hitting the banking sector as the main mechanism generating contagion. In contrast, Allen and Carletti (2007) focus on the impact of different accounting methods and show that mark to market accounting can lead to contagion in situations where historic cost-based accounting values do not.

Bubbles

The idea that the amount of liquidity available is an important factor in the determination of asset prices has a long history. In addition to the liquidity provided by the market, the liquidity in the form of money and credit provided by the central bank also plays an important role. This aspect of liquidity provision is the focus here. In his description of historic bubbles, Kindleberger (1978; p 54) emphasises the role of this factor: “Speculative manias gather speed through expansion of money and credit or perhaps, in some cases,

liberalizacije bila važan faktor. Možda je najbolje poznat primer ove vrste fenomena dramatičan porast cena nekretnina i akcija koji se dogodio u Japanu krajem 1980-tih godina i njihov kasniji kolaps 1990. godine. Sledećih nekoliko godina obeleženo je neizvršenjem obaveza i kresanjem finansijskog sistema. Realna ekonomija bila je pogođena posledicama koje su proizašle iz mehura a stope rasta tokom 1990-tih godina bile su uglavnom neznatno pozitivne ili negativne, nasuprot najvećeg dela posleratnog perioda kada su bile mnogo više.

Ovaj i drugi primeri ukazuju na odnos između pojave znatnog rasta cena aktive ili pozitivnih mehurova i obezbeđenja likvidnosti. Oni takođe ilustruju da kolaps mehura može da vodi u teške probleme zato što pad cena aktive dovodi do ograničavanja bankarskog sektora. Banke koje drže nekretnine i akcije čije cene padaju (ili imaju kredite kod vlasnika te aktive) često dolaze pod žestok pritisak povlačenja jer su njihove obaveze fiksne. Ovo ih primorava da otkazuju kredite i likvidiraju svoju aktivu, što sa svoje strane pogoršava problem pada cena aktive. Drugim rečima, mogu se javiti negativni mehurovi cena aktive kao i pozitivni. Ovi negativni mehurovi, kod kojih cene aktive padnu isuviše, mogu da budu vrlo opasni po banke i druge finansijske posrednike. Ovo može da pravi realnoj ekonomiji probleme koji su veći nego što je moralo da budu.

Uprkos očiglednog empirijskog značaja odnosa između likvidnosti i mehurova cena aktive, ne postoji šire usaglašena teorija o tome šta je u osnovi ovih odnosa. Allen and Gale (2000b) daju teoriju zasnovanu na postojanju problema posredovanja. Mnogi investitori na tržištima nekretnina i akcija dobijaju svoja sredstva za investiranje iz eksternih izvora. Ako krajnji provajderi sredstava nisu u mogućnosti da vide karakteristike investiranja, postoji klasičan problem prenošenja rizika. Prenošnje rizika povećava povraćaj na investicije u rizičnu aktivu i dovodi do toga da investitori utiču na rast cena iznad njihovih osnovnih vrednosti. Ključna determinanta cena aktive je na taj način obim datih kredita. Finansijska liberalizacija, povećanjem obima kredita i stvaranjem neizvesnosti u pogledu kretanja buduće ekspanzije kredita, može da ima interakciju sa problemom posredovanja i da vodi u mehur

cena aktive.

Kada mehur prsne, zato što su prihodi niski ili zato što centralna banka smanji kredit, banke su pod velikim pritiskom. Mnoge njihove obaveze su fiksne a pada vrednost aktive. Deponenti i drugi poverioci mogu da odluče da povuku svoja sredstva anticipirajući nastupanje problema. Ovo će nagoniti banke da likvidiraju neku svoju aktivu što može dovesti do daljeg pada mehura aktive zbog nedostatka likvidnosti na tržištu. Može se pokazati da kada postoji tržište rizične aktive njihovu cenu određuje cena zasnovana na novcu na tržištu u nekim državama i može da padne ispod njihove osnovne vrednosti. Ovo vodi neefikasnoj alokaciji resursa. Centralna banka može da eliminiše ovu neefikasnost odgovarajućom injekcijom likvidnosti na tržištu.

Diskusija

Identifikovali smo dva nedostatka na tržištima. Prvi se tiče problema koordinacije u vezi sa panikom. Problem da se ovo analizira iz perspektive politike je da ne postoji široko prihvaćen metod izbora ravnoteža. Globalne igre su jedan od pristupa koji obećava, ali za sada postoje ograničeni empirijski dokazi koji bi poduprli ovu metodologiju. Drugi nedostatak tržišta je nekompletnost finansijskih tržišta. Suštinski problem ovde je da podsticaji za obezbeđenje likvidnosti vode neefikasnoj alokaciji resursa. Diskutovali smo tri manifestacije nedostatka tržišta u vezi sa obezbeđenjem likvidnosti. To su finansijska krhkost, zaraza i cenovni mehuri.

Okvir koji smo razvili omogućava neki uvid u pitanje kada finansijski sistem deluje kao amortizer šoka a kada deluje kao pojačivač. Kada su tržišta kompletna i tržište nema nedostatak, finansijski sistem deluje kao amortizer šoka. Rizici se rasprostiru efikasno kroz ekonomske agense. U ovom smislu rizici se absorbuju. Kada tržište ima nedostatak, finansijski sistem deluje kao pojačivač. U slučaju panika, javlja se ekstremni efekat pojačavanja. Sunčeve pege su šokovi koji po sebi nemaju efekat, međutim, ako se koriste kao sredstvo koordinacije one mogu da imaju ekstremni efekat na alokaciju ravnoteže i u tom smislu finansijski sistem deluje kao

get started because of an initial expansion of money and credit”.

In many recent cases where asset prices have risen and then collapsed dramatically, an expansion in credit following financial liberalisation appears to have been an important factor. Perhaps the best known example of this type of phenomenon is the dramatic rise in real estate and stock prices that occurred in Japan in the late 1980s and their subsequent collapse in 1990. The next few years were marked by defaults and retrenchment in the financial system. The real economy was adversely affected by the aftermath of the bubble, and growth rates during the 1990s were typically slightly positive or negative, in contrast to most of the postwar period when they were much higher.

This and other examples suggest a relationship between the occurrence of significant rises in asset prices or positive bubbles and the provision of liquidity. They also illustrate that the collapse in the bubble can lead to severe problems because the fall in asset prices results in strains on the banking sector. Banks holding real estate and stocks with falling prices (or with loans to the owners of these assets) often come under severe pressure from withdrawals because their liabilities are fixed. This forces them to call in loans and liquidate their assets, which in turn appears to exacerbate the problem of falling asset prices. In other words, there may be negative asset price bubbles as well as positive ones. These negative bubbles, in which asset prices fall too far, can be very damaging to banks and other financial intermediaries. This can make the problems in the real economy more severe than they need have been.

Despite the apparent empirical importance of the relationship between liquidity and asset price bubbles, there is no widely agreed theory of what underlies these relationships. Allen and Gale (2000b) provide a theory based on the existence of an agency problem. Many investors in real estate and stock markets obtain their investment funds from external sources. If the ultimate providers of funds are unable to observe the characteristics of the investment, there is a classic risk-shifting problem. Risk-shifting increases the return to investment

in risky assets and causes investors to bid up prices above their fundamental values. A crucial determinant of asset prices is thus the amount of credit provided. Financial liberalisation, by expanding the volume of credit and creating uncertainty about the future path of credit expansion, can interact with the agency problem and lead to a bubble in asset prices.

When the bubble bursts, either because returns are low or because the central bank tightens credit, banks are put under severe strain. Many of their liabilities are fixed while their assets fall in value. Depositors and other claimants may decide to withdraw their funds in anticipation of problems to come. This will force banks to liquidate some of their assets, which may result in a further fall in asset bubbles because of a lack of liquidity in the market. It can be shown that when there is a market for risky assets, their price is determined by “cash-in-the-market pricing” in some states and can fall below their fundamental value. This leads to an inefficient allocation of resources. The central bank can eliminate this inefficiency by an appropriate injection of liquidity into the market.

Discussion

We have identified two market failures. The first concerns a coordination problem associated with panics. The problem in analysing this from a policy perspective is that there is no widely accepted method for selecting equilibria. Global games are one promising approach, but as yet there is limited empirical evidence to support this methodology. The second market failure concerns the incompleteness of financial markets. The essential problem here is that the incentives to provide liquidity lead to an inefficient allocation of resources. We have discussed three manifestations of market failure associated with liquidity provision. These are financial fragility, contagion and asset price bubbles.

The framework we have developed allows some insight into the question of when the financial system acts a shock absorber and when it acts as an amplifier. When markets are complete and there is no market failure, the financial system acts as a shock absorber. Risks

pojačivač.

Drugi nedostatak nekompletnih tržišta u modelima zasnovanim na fundamentalnim faktorima takođe dejstvuje kao pojačivač. Finansijska krhkost je drugi ekstremni primer. Ovde mali šokovi mogu ponovo da vode do velikih promena cena aktive. Ova volatilnost, sa svoje strane, može da vodi do znatnih poremećaja i kriza. Sa zarazom, ponovo imamo pojačavanje. Šok u jednom regionu može da se prelije na druge i da ima mnogo veći efekat od originalnog šoka. Najzad, mehuri cena aktive mogu takođe da vode do velikih ekonomskih problema i u tom smislu su pojačivači.

Pošto smo identifikovali kada postoje tržišni nedostaci, pitanje koje prirodno sledi jeste da li ima politike koja može da koriguje neželjene efekte takvih nedostataka. Kod prvog tržišnog nedostatka sa panikama, jedna od glavnih poenti koje čine Diamond and Dybvig (1983) jeste da osiguranje depozita predstavlja način da se eliminiše višestrukost ravnoteža. U praksi, osiguranje depozita nije kompletno jer su po pravilu pokriveni samo mali deponenti. Kao rezultat, postojeće šeme osiguranja depozita ne sprečavaju mogućnost pojave panike. Analiza osiguranja depozita kao načina za eliminisanja kriza zaslužuje veću pažnju. Ona potencijalno pruža potvrdu zašto je potrebno osiguranje depozita, što sa svoje strane opravdava potrebu za regulisanjem kapitala. U standardnim analizama regulisanja kapitala, potreba za ovim se obično opravdava postojanjem osiguranja depozita, ali to se jednostavno pretpostavlja. Potpuna analiza zahteva potrebu da osiguranje depozita bude valjano modelirano.

U kontekstu tržišnih nedostataka zbog nekompletnih tržišta u modelima zasnovanim na fundamentalnim faktorima, Allen and Gale (2004a, 2007) i Gale and Ozgur (2005) razmatraju dve vrste regulative: regulisanje likvidnosti banaka i regulisanje kapitala banaka. Allen i Gale (2004a) istražuju regulisanje likvidnosti banaka i pokazuju da zahtev da banke drže veću likvidnost nego što bi odlučile unapređuje dobrobit ako je relativna averzija prema riziku

iznad 1. Gale and Ozgur (2005) istražuju proste primere sa potrošačima koji imaju konstantnu relativno nisku averziju prema riziku, kada su tržišta nekompletna. Pokazuje se da efekat regulisanja bankarskog kapitala zavisi kritično od stepena relativne averzije prema riziku. Kada je averzija prema riziku dovoljno niska (ispod 2), povećanje nivoa kapitala banaka iznad onog što bi banke dobrovoljno držale može da koristi svima. Zahtevi za informacijama za ove vrste intervencija su visoki. Tako, može biti teško unaprediti dobrobit kroz ove vrste regulative sa praktične strane.

Finansijska krhkost, zaraza i mehuri cena aktive takođe su manifestacija tržišnih nedostataka. Politika potrebna da rešava ove probleme je prilično raznovrsna. Ova pitanja nisu bila intenzivno analizirana. Međutim, izgleda verovatno da je potrebno obezbeđenje likvidnosti od strane centralne banke za njihovo prevazilaženje. Odnos između monetarne politike i kontrole kriza ne razume se dovoljno. Za slučaj finansijske krhkosti, problem je volatilnost cena koji nastaje iz privatnih podsticaja za obezbeđenjem likvidnosti. Injekcijom monetarne likvidnosti u međubankarsko tržište, centralna banka može promeniti volatilnost cena i time finansijsku krhkost. Kod zaraze problem je opet nedostatak likvidnosti. Injekcijom likvidnosti u međubankarsko tržište, centralna banka može biti u stanju da spreči širenje krize. Takođe, mehuri cena aktive predstavljaju važnu oblast gde centralna banka može da koristi monetarnu politiku za rešavanje tržišnog nedostatka.

Razvoj mikroekonomskih bankarskih modela sa monetarnim kanalima je u ranoj fazi. Allen and Gale (1998, 2007) i Diamond and Rajan (2006), pored ostalih, učinili su korake u tom pravcu. Međutim, uloga monetarne politike u rešavanju ovih tržišnih nedostataka i pretvaranje finansijskog sistema u amortizera šoka umesto u pojačivača predstavlja važnu temu za buduća istraživanja.

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are spread efficiently across economic agents. In this sense, risks are absorbed. When there is a market failure, the financial system can act as an amplifier. In the case of panics, there is an extreme amplification effect. Sunspots are shocks that by themselves have no effect; however, if they are used as coordination devices they can have an extreme effect on the equilibrium allocation, and in that sense the financial system acts as an amplifier.

The second market failure of incomplete markets in fundamental-based models also acts as an amplifier. Financial fragility is another extreme example. Here, small shocks can again lead to large changes in asset prices. This volatility, in turn, can lead to significant disruption and crises. With contagion, there is again amplification. A shock in one region can spill over to others and have a much larger effect than the original one. Finally, asset price bubbles can also lead to large economic problems and in that sense are amplifiers.

Having identified when there is a market failure, the question that naturally follows is whether there are policies that can correct the undesirable effects of such failures. With the first market failure of panics, one of the main points that Diamond and Dybvig (1983) make is that deposit insurance is a way of eliminating the multiplicity of equilibria. In practice, deposit insurance is not complete since typically only small depositors are covered. As a result, actual deposit insurance schemes do not prevent the possibility of panics. The analysis of deposit insurance as a way of eliminating crises deserves more attention. It potentially provides an underpinning for why deposit insurance is needed, which in turn justifies the need for capital regulation. In standard analyses of capital regulation, the need for this is usually justified by the existence of deposit insurance, but this is simply assumed. A full analysis requires the need for deposit insurance to be properly modelled.

In the context of the market failure due to incomplete markets in fundamental-based models, Allen and Gale (2004a, 2007) and Gale and Özgür (2005) consider two types of regulation: regulation of bank liquidity and

regulation of bank capital. Allen and Gale (2004a) investigate bank liquidity regulation and show that requiring banks to hold more liquidity than they would choose to is welfare-improving if relative risk aversion is above 1. Gale and Özgür (2005) investigate simple examples with consumers who have constant relative risk aversion, when financial markets are incomplete. It is shown that the effect of bank capital regulation depends critically on the degree of relative risk aversion. When relative risk aversion is sufficiently low (below 2), increasing levels of bank capital above what banks would voluntarily hold can benefit all involved. The informational requirements for these kinds of intervention are high. Thus, it may be difficult to improve welfare through these kinds of regulation as a practical matter.

Financial fragility, contagion and asset price bubbles are also manifestations of market failures. The policies required for dealing with these are rather different. These issues have not been extensively analysed; however, it seems likely that provision of liquidity by the central bank is required to overcome them. The relationship between monetary policy and the control of crises is not well understood. For the case of financial fragility, the problem is the price volatility that arises from private incentives for liquidity provision. By injecting monetary liquidity into the market, the central bank may be able to change the price volatility and hence financial fragility. With contagion, the problem is again a lack of liquidity. By injecting liquidity into the interbank market, the central bank may be able to prevent the spread of crises. Also, asset price bubbles represent an important area where the central bank may be able to use monetary policy to solve the market failure.

The development of microeconomic banking models with monetary channels is at an early stage. Allen and Gale (1998, 2007) and Diamond and Rajan (2006), among others, have made steps in this direction. However, the role of monetary policy in solving these market failures and turning the financial system into a shock absorber rather than an amplifier represents an important topic for future research.

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