Bankruptcy resolution capacity and regional economic fluctuations*

Uluc Aysun[a**]

Raman Khaddaria[a]

a *University of Central Florida, Orlando, FL 32816*

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Abstract:
In this paper we uncover a relationship between regional economic fluctuations and bankruptcy resolution capacity and predict that its direction depends on the cyclicality of bankruptcy. If bankruptcy is countercyclical (procyclical), we predict that economic fluctuations should be more(less) severe in regions with lower judicial capacity. This is because in these regions, bank lending is more sensitive to judicial capacity and shocks that have a countercyclical (procyclical) effect on bankruptcy are amplified (mitigated) by more. We find evidence showing that bankruptcy is countercyclical and that in US states with lower judicial capacity, economic fluctuations are more severe.

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** Corresponding author: Department of Economics, University of Central Florida, College of Business Administration 4000 Central Florida Blvd., Orlando, Florida 32816-1991, Email: uaysun@bus.ucf.edu ph. +1 530 574 3951, fax: +1 407 823 3269.

1. Introduction

It is well-established that the quality of institutions is a key determinant of the cross-country differences in short-term economic fluctuations (e.g. Acemoglu, Johnson, and Robinson, 2003; Aghion et al., 2004; Ranciere et al, 2008; Schneider and Tornell, 2004). The large cross-country differences in institutional quality make this finding economically important as well. Since the quality of institutions in the regions of a country are generally similar, however, researchers have traditionally considered regional characteristics such as demographic/labor-market structure and industrial composition in explaining the disparities in the duration and the amplitude of regional business cycles (e.g. McLaughlin, 1930; Borts, 1960; Sum and Rush, 1975; Toal, 1977). These characteristics are also the central emphasis in more recent studies such as Crone (2005), Carlino and Defina (1995, 1998) and Croux et al. (2001).

In this paper, we instead focus on one aspect of institutions in the United States, the capacity/efficiency of regional bankruptcy courts (hereafter, judicial capacity), and investigate whether this institutional characteristic plays an important role in determining the cross-state differences in the magnitude of economic fluctuations. One justification of this focus is that regional judicial capacities, unlike broad institutional characteristics such as of legal origin, central bank independence and corruption, can be considerably different across states and are thus possibly related to the cross-state differences in economic fluctuations.[1]

To more clearly identify this relationship, we begin by exploring the channels through which judicial capacity can have an impact on the magnitude of economic fluctuations in a simple partial equilibrium framework similar in essence to the Diamond and Dybvig (1983)

[1] The measure we use for judicial capacity in the second half of the paper, the case turnover ratio (the annual rate at which bankruptcy cases are resolved) for example, illustrates a large variation in judicial capacity. These ratios are reported in the second column of Table B.1 in Appendix B.

bank-run model. The central extension we make to the Diamond and Dybvig (1983) framework is the addition of financial frictions. Specifically, we assume reasonably that a portion of loans that banks make go bad and banks cannot recover these funds immediately and have to incur bankruptcy costs -- the source of financial frictions in the model. Banks' rate of loan recovery, in turn, depends on the capacity of courts (this includes the efficiency of the courts and the availability of resources such as judges and clerks) to resolve bankruptcy cases quickly. It is important to note here that we are deviating from the usual interpretation of bankruptcy costs in costly-state-verification frameworks (e.g. Bernanke and Gertler, 1989; Bernanke et al., 1999; Carlstrom and Fuerst, 1997; Prescott and Townsend, 1984; Townsend, 1979) as the static auditing and legal costs associated with a bankruptcy. In our model, bankruptcy costs additionally depend positively on the duration of bankruptcy since it is widely-agreed that the increase in uncertainty when bankruptcy proceedings are prolonged cause a sharper drop in the values of borrowers' assets and creditors' recovery rates.[2]

Given this general setup and assuming that the amount of bad loans is positively related to leverage, we find, as expected, that in economies with lower judicial capacity (higher financial frictions) the level of production/investment is smaller. Lower judicial capacity and the lower rates of loan recovery make banks less willing to finance long-term, productive projects due to the possibility of higher bankruptcy costs. The more central result for our paper, however, is that the fluctuations of production/investment (in addition to its level) are also related to judicial capacity. This relationship is not unidirectional and depends on whether the shocks that affect production also have a procyclical or a countercyclical effect on the number of bankruptcies. Here we assume that an increase in the number of bankruptcies increases bankruptcy costs (and

[2] See, for example, Weiss (1990) for evidence supporting the positive relationship between the duration of bankruptcy proceedings and economic losses.

the banks' recovery rates) by prolonging the bankruptcy proceedings.[3] Thus, for example, if a shock that has a negative impact on production also increases the number of bankruptcies and thus the duration of proceedings, it is amplified by the judicial process and there is a larger drop in output (and in general, larger economic fluctuations). In contrast, if this adverse shock decreases the number of bankruptcies, it mitigates the negative effect on output. More importantly, we find that this channel of transmission is stronger when the judicial capacity is lower. The reason is that in economies with lower judicial capacity the duration of bankruptcies and the recovery rate become more sensitive to the number of new bankruptcy filings and economic shocks can have a larger impact on the amount of lending and economic activity through their effect on the judicial system.

Overall, the model predicts that the effect of judicial capacity on economic fluctuations depends on the cyclicality of bankruptcy. If bankruptcy is mostly procyclical, economic fluctuations would be less severe in economies with lower judicial capacity since the initial increase in output, for example, would be mitigated by the increase in the number of bankruptcies and this mitigation mechanism would be stronger compared to an economy with a higher judicial capacity. This unique inference from our model is different from the usual inferences drawn from costly-state-verification models and suggests that financial frictions may not always amplify economic shocks. By contrast, if bankruptcy is mostly countercyclical, the initial increase in output would be amplified by the decrease in the number of bankruptcies and

[3] Empirical evidence supports this positive relationship between the duration of bankruptcy and the number of bankruptcies. For example, LoPucki (2005), investigating a single court, finds that an increase in the number of days in bankruptcy is the result of high filing rates and judges/lawyers devoting less time for each case when they are overworked. United States Federal Courts' caseload statistics indicate a similar positive relationship. For example, the total number of bankruptcy filings in years 2007, 2008, 2009 and 2010 were approximately 0.7, 0.9, 1.2, 1.5 million, respectively and the mean time interval between filing and closing for consumer cases (averaged across chapters 7, 11, and 13) for years 2007-2010 were 155, 277, 393 and 512, respectively.

this amplification mechanism would be stronger in economies with lower judicial capacity. In these economies, therefore, economic fluctuations would be more severe.

In the second half of the paper we empirically test these predictions of the model. In doing so, we begin by investigating aggregate bankruptcy data from the United States Federal Courts database and bank-level loan default data from the Federal Reserve's Call Reports of Condition and Income database to determine the cyclicality of bankruptcy. Simple correlations and panel regressions illustrate that both the number of bankruptcies and the amount of bad loans is countercyclical (during recessions (expansions) there is an increase (a decrease) in the number of bankruptcies and the amount of bad loans).

This result according to our model implies a negative relationship between judicial capacity and the level of economic fluctuations. Using data from US states, we proceed by testing the empirical validity of this negative relationship. Our results, robust to various tests, indicate a significant, negative relationship between the state-level case turnover ratio (our measure of judicial capacity) and the mean level of deviations from the long-run trend of state income growth (our measure of economic fluctuations). We find that this relationship is independent of other judicial characteristics and the industrial composition of states, and that it is economically important. For example, our results suggest that if Louisiana's case turnover ratio were to increase to the levels observed in Florida (10 percentage points difference), her income would be 1.1 percent less volatile in a given year.

The rest of the paper is organized as follows: Section 2 presents the partial equilibrium framework and makes predictions for the relationship between judicial capacity and economic fluctuations. Section 3 provides empirical evidence that bankruptcy is countercyclical. Section 4 performs empirical tests to determine the relationship between judicial capacity and economic fluctuations. Section 5 concludes.

2. Financial frictions and economic fluctuations in a partial equilibrium framework

In this section we investigate how financial frictions caused by a costly bankruptcy resolution process can have an impact on the volatility of economic activity. To do so, we build a simple, three-period model and determine whether financial frictions amplify or mitigate the effect of economic shocks on output. In building our model, we take the partial equilibrium, bank-run framework of Diamond and Dybvig (1983) as our starting point. The reason we start with this model is that it captures, in a compact way, the lending decisions of banks and how the mismatches in the maturity of their assets and liabilities can affect their willingness to finance long-term, productive investments thereby affecting output. We begin by describing the baseline model and explaining how we extend it.

The model

The economy in the model includes a bank, consumers and a firm. The firm and the bank are owned by the consumers of two types: patient and impatient. There are λ impatient and $(1-\lambda)$ patient consumers and they are born with an endowment e in period 0. The impatient and patient consumers value consumption only in periods 1 and 2 (x and y), respectively but they do not know their types until period 1. This is important because the bank, the only decision maker in this economy, determines how much to allocate to period 1 and period 2 consumption in period 0 before the consumer types are revealed. In period 0, the bank can use its funds in two ways: finance a long-term project (its amount denoted by k) which has a rate of return R and whose returns can only be used for period 2 consumption and/or finance period 1 consumption in which case the rate of return is equal to zero. Thus we normalize the interest rates in this market to zero so that one dollar invested (in assets other than the long-term project) in period 0 yields one dollar in either period 1 or period 2.

To incorporate bankruptcy costs, we first extend this framework by assuming that a fraction of the loans (investments in the long-term project) go bad in period 1. When there is bankruptcy, the rate of loan recovery is determined by a bankruptcy process which we describe in detail below. We should note at this point, however, that the bankruptcy process in our model is costly since banks can only recover a fraction of the bad loans. This feature is the source of financial frictions in our model. Note that by assuming that there are bad loans, we deviate from the framework in Diamond and Dybvig (1983). In their model, banks liquidate long term investments to meet the short term demand for deposits during a bank run. In contrast, we focus on a non-crisis setting where there is no run on the bank.

Given this general outline, the utility of the representative agent and the corresponding social planner problem can be represented as follows:

$$max\ \lambda u(x) + (1-\lambda)u(y) \qquad s.t.,$$

$$k \leq e \tag{1}$$

$$\lambda x \leq \alpha l + e - k \tag{2}$$

$$(1-\lambda)y \leq R(k-l) \tag{3}$$

$$y \geq x \tag{4}$$

$$l = l(k) \qquad 0 < l_k < 1 \tag{5}$$

$$\alpha = \theta l^{\gamma-1}(j)^{(1-\gamma)} \tag{6}$$

$R > 1,\; x, y, k, l, e \geq 0$

where $u(\cdot)$ is the utility function and it is in logarithmic form.[4] Equations (1), (2) and (3) represent the bank's resource constraints in periods 0, 1 and 2, respectively and the incentive compatibility constraint in equation (4) ensures that patient agents do not lie about their type. In equation (5), we model the amount of bad loans as an increasing function of investment. The assumption we make here is that borrowers, with a given level of net worth/endowment, invest in riskier projects when they are provided with additional funds (and thus are more leveraged). We reasonably constrain the function so that an additional unit of endowment allocated to the long-term project, despite increasing the amount of bad loans, generates a net increase in investment.[5]

Turning to the resource constraints, in period 0, the bank cannot lend more than its resources (total endowment). The amount that the bank does not lend in period 0 becomes available for period 1 consumption (the second expression on the right hand side of equation (2)). The bank finances period 1 consumption of impatient agents also with the amount of bad loans recovered in period 1. We assume that the bank can only recover a fraction α of the loans in period 1. This rate of recovery is determined by the matching/production function in equation (6) where j denotes judicial capacity which encompasses the amount of judicial resources available (for example, the number of judges and clerks) and the effectiveness of these resources

[4] Although we are using a 3-period model, the weighted utility function does not include a discount factor. This is mainly because the social planner, in maximizing the utility function, fully discounts period 2 consumption for impatient agents since they only value consumption in period 1.

[5] A more reasonable representation of the amount of bad loans would be through a convex function of investment. This would allow one to find a more than proportional increase in bad loans with every unit of investment (given a certain level of net worth). Although we would expect this alternative modeling strategy to reinforce our results since recovery rates and lending decisions would become more sensitive to judicial capacity, the computations become very complicated and the interpretation of the results becomes confounded. We thus assume that the function is of linear form.

and θ is a normalizing parameter which ensures that α <1. This parameter can be interpreted as the costs of bankruptcy that are independent of judicial resources and their efficiency. The matching function indicates that the amount recovered, $\alpha l = \theta l^{\gamma}(j)^{(1-\gamma)}$, is positively related to the judicial capacity and the amount of bad loans, although the rate of recovery is negatively related to the amount of bad loans. The implicit mechanism here is that an increase in the number of bankruptcies decreases the recovery rate by prolonging the bankruptcy resolution process which in turn increases uncertainty and causes a decrease in asset prices. We make two additional assumptions to simplify computations. First, we assume that the sensitivity of the rate of recovery to l and *j* are governed by a single parameter (γ). Second, we assume that the value of the loans recovered in the second period is equal to zero.[6]

Given this utility maximization problem and the fact that there is no aggregate uncertainty, feasibility constraints (2) and (3) always bind and one can find the following optimal consumption allocation between the patient and impatient consumers:

$$\frac{y}{x} = \frac{R(1-l_k)}{1-l_k\gamma\alpha}, \tag{7}$$

where $y = R(k-l)/(1-\lambda)$ and $x = (\alpha l + e - k)/\lambda$.

Using this optimality condition it is then straightforward to derive the relationship between judicial capacity and optimal level of investment.

$$\frac{\partial k^*}{\partial j} = \frac{\alpha_j\left((1-\lambda)(1-l_{k^*})l + \lambda\gamma l_{k^*}(k-l)\right)}{1-\alpha l_{k^*}\left(1-\lambda(1-\gamma)\right)+\varsigma} \tag{8}$$

[6] Alternatively we assumed that the loans were recovered in periods 1 and period 2 and that the recovery costs were higher in the second period. The computations were much more complicated but they did not produce different results.

where ς represents a negligible number since only a small fraction of the loans go bad and thus $(l_{k^*})^2$ is a small number.[7,8] Equation (8) indicates a positive relationship between judicial capacity and optimal investment since the denominator and the numerator are both greater than zero.

The expression in equation (8) depends both positively and negatively on l_{k^*}. On the one hand, when the proportion of loans that go bad is high, recovery rates become more sensitive to the changes in judicial capacity and an increase in judicial capacity, for example, has a larger impact on investment. On the other hand, the marginal utility of an additional unit of endowment allocated to period 1 consumption relative to the marginal utility it generates in period 2 is higher when l_{k^*} is high and this disparity between the marginal utilities in periods 1 and 2 is stronger when judicial capacity is high. An increase in judicial capacity, therefore, prompts a smaller amount of investment in the long-term project. The negative effect of l_{k^*} on $\partial k^* / \partial j$ is dominated by its positive effects.[9] Thus when there are a large number of bankruptcies, financial frictions cause larger output losses (compared to an economy with a small number of bankruptcies). More importantly, it is during these times that judicial capacity becomes more binding and an increase in capacity, for example, has a larger positive impact on recovery rates and bank lending. This positive effect is larger when the judicial capacity has a larger share in the matching function (in other words, when α_j is large). We also find that the increase in the

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[7] $\varsigma = (l_{k^*})^2 (1-\lambda)\left[\gamma\alpha + y\gamma(1-\gamma)\theta j^{(1-\gamma)} l^{\gamma-2} + \frac{(R-1)}{\lambda}\left[(1-\gamma)\theta j^{(1-\gamma)} l^{\gamma-1} - \alpha\right]\right]$

[8] The fraction of bad loans are typically calibrated to 3% per year (e.g. Bernanke et al., 1999)

[9] The expression in equation (8) becomes negatively related to l_{k^*} when the proportion of impatient agents, λ is very small. The incentive compatibility constraint in equation (4), however, does not allow for these small values by restricting λ to be greater than $(\alpha l + e - k)/(R(k-l) + \alpha l + e - k)$.

share of patient agents, the weight of judicial capacity in the matching function and the recovery rate (not necessarily due to an increase in *l* or *j*) prompt a higher level of investment in the long-run project and reinforce the positive effects of judicial capacity on the optimal level of investment.

The focus of this paper is the relationship between judicial capacity and output volatility. Thus, we now investigate whether the impact of shocks on the economy are amplified or mitigated when the judicial capacity is high (or low). We find that the effect of judicial capacity on output volatility (or investment on the long-run project in the model) depends on whether the effect of shocks on the amount of bad loans is procyclical or countercyclical. We illustrate this disparity by considering an endowment shock (an exogenous change in *e*) that is and is not accommodated by an exogenous decrease in the amount of bad loans.

A short-term shock with procyclical bankruptcy

The effect of an endowment shock on the optimal level of investment can be derived using the optimality condition in equation (7) as follows:

$$\frac{\partial k^*}{\partial e} = \frac{(1-\lambda)(1-l_{k^*})}{1-\alpha l_{k^*}(1-\lambda(1-\gamma))} \tag{9}$$

It is clear that a positive shock to endowment increases investment and the size of this effect is positively related to α and judicial capacity.[10] The reason for the former result is that an increase in endowment generates a positive wedge between the marginal utilities of patient and impatient agents and the bank thus allocates more funds to the long-term investment project. There is an increase in investment although impatient agents cross-subsidize the patient agents,

[10] This impact of judicial capacity is as follows: $\frac{\partial k^*}{\partial e \partial j} = \frac{\alpha_j (1-\lambda)(1-\lambda(1-\gamma))(1-l_{k^*})l_{k^*}}{[1-\alpha l_{k^*}(1-\lambda(1-\gamma))]^2}$

and there is an increase in the number bankruptcies. The later result (that the expression in equation (9) is positively related to judicial capacity) is more critical for this paper and implies that in economies with efficient judicial systems positive, short-term shocks will have a larger effect on output. The reason is that the recovery rates (the level of financial frictions) are less sensitive to the increase in the volume of bankruptcies that results from higher economic activity (i.e., the procyclicality of bankruptcies) when the judicial capacity is high. In contrast, in an economy with low judicial capacity (high financial frictions) the increase in bankruptcies prompt a sharper decrease in recovery rates and thus mitigate the initial positive impact on investment by more.

Similar conclusions can be drawn if the reason for the increase (decrease) in investment is an exogenous decrease (increase) in the share of impatient agents or the long-term project's return. For both cases the endogenous response of investment and the amount of bad loans interacts with the judicial capacity to amplify the overall effect. This amplification mechanism is stronger when the judicial capacity is low.

A short-term shock that has procyclical and countercyclical effects on bankruptcy

In this section, we consider a shock that decreases the amount of bad loans exogenously in addition to its positive effects on endowment. One example for this type of a shock is an expansionary monetary policy shock. It has been well-established by credit channel theory that an important way in which monetary policy is transmitted to the real economy is through borrower balance sheets (Bernanke et al., 1999). According to this theory, expansionary monetary policy increases the value of assets that borrowers hold and increases their net worth (endowment in our model), making them less leveraged financially and less likely to default on their loans. More generally, any economic shock that positively affects asset prices would be an example of the type of shock under consideration in this exercise. Let *x* denote this short-term shock then its effect on investment can be derived as follows:

$$\frac{\partial k^*}{\partial x} = \frac{(1-\lambda)(1-l_{k^*})e_x + l_x\left[\lambda + (1-\lambda)\alpha\gamma\right]}{1-\alpha l_{k^*}\left(1-\lambda(1-\gamma)\right)} \tag{10}$$

Under this scenario, the amount of bad loans, similarly, increase due to an increase in economic activity if the shock is positive. This endogenous response of the number of bankruptcies may also be due to the higher risk taking that follows the decrease in the likelihood of bankruptcy (possibly due to a decrease in borrowers' leverage). These two effects, however, are counteracted by the exogenous decrease in bad loans and thus the amount of bad loans may not necessarily be procyclical.

The mechanism through which the short term shock interacts with the judicial capacity to amplify its impact is as explained above. But now since there is a negative effect on the amount of bad loans ($l_x < 0$), the level of judicial capacity may not always amplify the impact of the shock. In other words, the effect of shocks on investment can be lower in economies characterized with higher judicial capacity (low levels of financial frictions). The reason is that when the shock generates a decrease in the number bankruptcies, this increases recovery rates by a larger amount in an economy with lower judicial capacity. In these economies, therefore, there is a sharper increase in investment. By contrast, economies with higher judicial capacity are less sensitive to the changes in bankruptcies and the increase in investment is not as large. The net effect of judicial capacity (whether it amplifies or mitigates the shock's impact) depends on the parameter values and the sensitivities of bad loans to the shock and investment but if the amount of bad loans is strongly countercyclical (procyclical), the shock's impact would be lower (higher) in economies with high judicial capacity.[11]

Overall, the model predicts that judicial capacity is related to the magnitude of the response to economic shocks and cyclicality of the number of bankruptcies determines whether shocks are amplified or mitigated by the judicial process, or rather by the financial frictions in this process. In the next two sections, we investigate empirical evidence to test these predictions of the model.

3. On the cyclicality of bankruptcy

Although the higher frequency of bankruptcies (and the larger amounts of bad loans) is typically associated with economic downturns, the number of bankruptcies can be procyclical due to volume effects and risk-taking. During an expansion, for example, it is reasonable to expect the higher amount of economic activity to also generate a higher number and volume of bankruptcies and it is possible that the increase in asset values typically observed during an expansion can encourage the firms to take more risk. The reasons for the higher risk-taking during economic expansions is described in theoretical studies such as Carlstrom and Fuerst (1997), Bernanke et al. (1999) and Rampini (2004). In this section, we first report simple aggregate evidence on the relationship between the number of bankruptcies and economic activity. We then investigate bank-level data to determine whether this relationship holds at the micro level.

Aggregate evidence

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[11] It can be shown that if $(1-\lambda)\gamma l_x > [1-\lambda(1-\gamma)] l_{k^*} \partial k^* / \partial x$, the shock's effect is mitigated by the level of judicial capacity.

United States Federal Courts compile case load and general bankruptcy statistics both at the state and national level. It is this database that we use to determine the relationship between economic activity and the number of filed bankruptcies. In doing so, we proxy economic activity (both for states and the U.S.) using the total state personal income data from the Bureau of Economic Analysis (BEA) and use annual data for the 2000-2010 sample period. This time period is determined by the availability of the bankruptcy data. Table 1 reports the pairwise correlations of bankruptcy cases filed and terminated with economic activity both at the national and state level. The results in the top and bottom panel are obtained by using the Hodrick-Prescott (HP) filter and log differences to measure real income growth during the sample period, respectively.[12] To measure the state level correlations we use a panel data of income growth and the number of bankruptcies.

The most important observation is that the number of bankruptcies filed is negatively related to economic activity, thus suggesting that the number of bankruptcies is countercyclical. Although we are using annual data, it can still be argued that the decline in economic activity precedes the declaration of bankruptcy. We, therefore, also compute the correlations of the number of bankruptcies with the 1 period lag of economic growth. The results are similar.[13] At the national level, we find a considerably stronger correlation during the 2001 recession and the Great Recession. State level results, however, indicate a stronger relationship only during the later period. We also find a similar negative relationship between the number of cases terminated and the level of economic activity. Thus the simple correlations predict an increase (decrease) in

[12] The data sources are provided in Appendix A. The GDP deflator is used to convert nominal income to real income. In measuring income growth with the HP filter, we use quarterly data and add the quarterly percentage deviations from the trend in a given year to obtain the annual growth rates.

[13] The correlations computed using more than 1 period lags were considerably smaller in magnitude.

the number of bankruptcies and the duration of termination during economic downturns (expansions).

Bank level evidence

To determine the cyclicality of bankruptcy at the bank-level we use the Federal Reserve's Call Reports of Condition and Income database. The dataset we construct is quarterly, spans the period 1982:Q1 to 2010:Q4 and has a large cross section dimension (over 6,000 banks in each quarter).[14] In this dataset, we use the amount of bad loans as an indicator of the degree of bankruptcy. Following Ashcraft and Campello (2007), we measure bad loans as the sum of loans not accruing and loans over 90 days late.[15]

Notice here we are focusing on the amount of nonperforming loans instead of the number of bankruptcies (since the number of loans that are nonperforming is not available) to determine the cyclicality of bankruptcy. We should, therefore, note that in drawing conclusions from this analysis, we are making two implicit assumptions. First, we assume that an increase in the amount of bad loans also increases the average settlement duration in the judicial system. Thus for example, if the number of nonperforming loans does not change but their amount increases, it also prolongs the bankruptcy proceedings. This assumption is consistent with the findings of Lawless and Ferris (2000), LoPucki and Doherty, (2004) and Bris et al. (2006) that bankruptcy costs and the duration of proceedings is higher when the business at stake is larger in value. Second, we reasonably assume that a state that has a large fraction of bad loans also has a higher frequency of bankruptcy.

[14] The data definitions are provided in Appendix A.
[15] The authors follow a similar strategy to our paper to measure the relationship between local economic conditions and bad loans as a share of total loans. In this paper, we focus on the amount of bad loans instead of their share in total loans to determine the cyclicality of bankruptcy.

As in the previous section, we approximate the level of local economic activity by using the quarterly total state personal income data from the Bureau of Economic Analysis and a HP filter to identify the cyclical components of income. Let bl_{it} and c_{it} denote the real growth rate of bad loans and a vector of control variables for bank *i* in period *t* and let y_{it} denote the income gap (a positive value representing an expansion) in the state that the bank operates in, then the panel model that we estimate can be represented as follows:

$$bl_{it} = \alpha + \sum_{k=1}^{4} \beta_k bl_{it-k} + \sum_{k=1}^{4} \gamma_k y_{it-k} + c_{it-1} + \varepsilon_{it} \,. \tag{11}$$

We use 4 lags of y_{it} to take into account the possibility that economic expansions/downturns can precede bankruptcy. In estimating equation (11), we control for banks' liquidity and financial leverage by using the liquid-to-total-assets ratio and the equity ratio because it is widely-accepted that these variables are related to the credit risk that banks take (see Rajan, 2006; Dell'Ariccia; Marquez, 2006 and Acharya and Skeie, 2011 for the relationship between liquidity and credit risk and see Flannery, 1989; Gennotte and Pyle, 1991; Gambacorta and Mistrulli, 2004 for a description of how banks' leverage affects credit-risk through regulatory restrictions and how leverage is, ex ante, related to loan portfolio choices). In addition, we control for the size and the liquidity of the bank holding companies (BHC) that the banks are affiliated with. We do so because it is agreed that internal capital markets are functioning effectively in the banking industry and thus the characteristic of a BHC can affect the credit risk of its subsidiaries.[16] We control for BHC size by measuring, in each quarter, the ratio of a BHC's assets to the total assets of all the BHC's in that quarter, similarly we use the liquid-to-total-assets ratio to control for liquidity and include 4 lags of each control variable.

[16] See Houston et al. (1997), Campello (2002), and de Haas and Lelyveldb (2010) for evidence showing that internal capital markets are functioning effectively.

The coefficient estimates and robust standard errors obtained by using a fixed effects estimator are displayed in Table 2. Our central finding is that the level of economic activity is negatively related to the amount of bad loans. The results in column 2, however, indicate that this negative relationship is only significant for smaller banks (banks that are not in the top 5 percent of the size distribution in a given quarter). This is not an unusual finding since we are using state income gaps to gauge the level of economic activity and smaller banks do more lending locally and are thus more affected by local economic conditions compared to larger banks. The coefficient value of -0.027 in column 1 suggests that if a state is experiencing a 1 percent increase in total personal income, the amount of bad loans decrease by 2.7 percent. We also find that this impact of economic conditions on the amount of bad loans, although significant, is smaller when crisis/recession periods are excluded.[17]

Turning to the other control variables, we find that banks' liquidity and equity ratios are negatively and positively related to the amount of bad loans, respectively. The latter result, consistent with the usual result in the studies mentioned above, may be due to the regulatory capital restrictions imposed on banks that take more risks. By contrast, there is no consensus on the relationship between bank liquidity and the amount of bad loans in the literature. On one hand studies such as Rajan (2006) Dell'Ariccia and Marquez (2006) argue that higher levels of bank liquidity prompts search for yield and higher risk-taking as in the period preceding the Great Recession. On the other hand, studies such as Acharya and Skeie (2011) argue that banks, especially during and after economic downturns, hoard precautionary liquidity and take less risks. Our results indicate that the precautionary motive outweighs the risk-taking motive throughout our sample. Out of the two BHC variables, only the BHC size is significantly related

[17] Following the Business Cycle Dating Committee (NBER), we exclude the periods 2007:Q3-2009:Q2, 2001:Q1-2001:Q3, 1990:Q3-1991:Q1, 1983:Q3-1984:Q4 to consider periods that are not characterized by a recession/crisis.

to the amount of bad loans. This relationship is positive for the whole sample and it is consistent with the argument that larger banks are more diversified and take more risks (e.g. Hughes et al., 2001).

Overall, in this section we found both aggregate and micro-level evidence suggesting that bankruptcy (in frequency and in amount) is countercyclical. In the next section we test whether this result is consistent with the direction of the relationship between judicial capacity and the level of economic fluctuations predicted by our model.

4. Case turnover ratios and regional business cycles

The partial equilibrium model in Section 2 predicted a negative (positive) relationship between judicial capacity and the size of economic fluctuations when bankruptcy is strongly countercyclical (procyclical). If the countercyclicality of bankruptcy is strong enough, we should then find smaller economic fluctuations in economies with higher judicial capacity. In this section we test this hypothesis by using state-level panel data to estimate the following model:

$$ef_{it} = \beta_0 + \beta_1 ef_{it-1} + \beta_2 jc_{it-1} + \gamma sc_{it-1} + \varepsilon_{it} \quad (12)$$

where ef_{it}, jc_{it} and sc_{it} denote the measure of economic fluctuations, the judicial capacity and state-specific control variables, respectively. In constructing our panel dataset, we use the United States Federal Courts case load statistics described in the previous section to measure judicial capacity and quarterly state income data from the BEA to measure economic fluctuations. Our dataset includes annual state-level observations for the time period 2000 to 2010. This sample period is determined by the availability of case load statistics.

To construct our dependent variable, as in the previous section, we first separate the cyclical deviation of real income from its long-run trend using a HP filter separately for each state. In doing so, we use quarterly data for the 1969:Q2 to 2010:Q4 period. We then add the absolute value of quarterly deviations in every year to obtain an annual measure of economic fluctuations. We measure the judicial capacity variable, the main independent variable of interest in our estimations, as the case turnover ratio. To compute this ratio we first aggregate district-level case load statistics and obtain state-level measures. We then divide the number of cases terminated in a given year (December-to-December) by the sum of the number cases pending at the beginning of the year and the number of filings during the year.[18] The average values of economic fluctuations and judicial capacity in our sample period are reported for each state in Appendix B.[19]

Besides the judicial capacity variable we also include industry structure variables on the right hand side. The industry structure variables in our estimations are the share of agriculture and mining, the share of manufacturing and the share of real estate and finance in states' annual gross domestic product (GDP). These variables are obtained from the BEA. We include these shares because there is a broad literature that finds/projects that since industries have different wage and skill requirements, their share in a given region's production also determines how total unemployment is decomposed into its cyclical and structural components (e.g. Phelps, 1970; Bulow and Summers, 1986; Summers, 1986; Neumann and Topel, 1991; Dickens and Weiler, 1993). Therefore, cyclical fluctuations of income across states could be due to the composition of their industries.

[18] Due to the differences in reporting intra-district transfers across districts, the total number of cases reported as pending at the end of a given period is not equal to the number obtained by adding the number of cases pending at the end of the prior period to the number of cases filed during the current period and then subtracting the number of cases terminated during the period. We thus instead compute the actual number of pending cases at the start of the 12-month period as described above. But we should note that the differences were very small and the results were very similar when we used the reported numbers.

[19] Although we consider aggregate figures, the case load statistics are available for each chapter of bankruptcy and for personal and commercial bankruptcies. For this paper, these distinctions do not play a critical role since the leverage – the amount of bad loans and the judicial capacity – recovery rates relationships in our theoretical framework hold for both individuals and firms and for each chapter of bankruptcy.

We choose to use the three industry categories (mentioned above) following the well-known three sector hypothesis of Clark (1940). According to this theory, the evolution and the structure of an economy and its response to shocks can be captured by considering the production share of three sectors: primary, secondary and tertiary. We represent the primary sector industries whose main activity is the extraction of raw materials and natural resources by the agriculture and mining sectors. The secondary sector in our estimations, i.e., manufacturing, in turn uses these raw materials in manufacturing processes and the tertiary sectors, real estate and finance, represent service activities. The main reason we focus on these two sectors is the important role they played in the economic fluctuations observed during the sample period (2000-2010). It is widely-agreed that the primary sector production and demand is less cyclical compared to the more interest rate sensitive secondary sector production and demand (e.g. Bils and McLaughlin, 2001; Ehrmann, 2004). The evidence on the relative cyclicality of the tertiary sector is, however, mixed. The tertiary sector is usually characterized by lower wages and skill requirements and higher rates of structural unemployment compared to cyclical unemployment. Therefore, one would expect economic fluctuations to be smaller in states that have a larger share of services industries. There is, however, evidence that contradicts this prediction. For example, studies such as Kirkegaard (2009) and Rothstein (2012) find that the negative relationship mentioned above does not hold for every subcategory of the tertiary sector, hysteresis may not always be higher in some services industries and that during the recent crisis the decline in the employment rate in the finance and real estate sectors were not too different from the economy-wide averages.

There are, of course, numerous state-specific characteristics besides industrial composition that can also generate different levels of economic fluctuations. Given the short sample period, differences in the time-invariant characteristics may be particularly important. To remove the time-invariant fixed effects, we use the two-step, system panel estimator developed by Arellano and Bover (1995). This strategy is designed for panel data that have a relatively large cross section dimension (similar to the data that we use) and also allows us to account for the potential endogeneity that may be generated by including the lags of the dependent variable on the right hand side, account for the nonstationarity of the dependent variable and obtain heteroskedasticity-consistent standard errors.[20]

The results are reported in Table 3. In each estimation, we find that the coefficient of the turnover ratio is significant and negative. A simple thought experiment reveals that the judicial capacity (turnover ratio) is also an economically important determinant of fluctuations. First notice that the coefficient value of -0.11 in our baseline regression indicates that if the turnover ratio increases by 1 percentage point, state-level income becomes 0.11 percent less volatile around its long run trend in a given year. This value then suggests that if Louisiana's turnover ratio were to increase to the levels observed in Florida (10 percentage points difference), for example, her income would be 1.1 percent less volatile in a given year. This is a large number since the mean value of fluctuations over the sample period for Louisiana is 3.7 percent. As expected, we find that the coefficient of the primary sector share is either insignificant and/or it is negative and that the coefficient of the secondary sector is positive and significant in all the regressions. The positive and significant coefficients of the tertiary sector share suggest that the real estate and the finance sectors were not as acyclical as the remaining subsectors of the tertiary sector during our sample period. In every regression, the specification tests supported the validity

[20] The drawback to obtaining heteroskedasticity-consistent standard errors with the two-step strategy is that the number of instruments are considerably larger compared to the one-step estimator and thus hypothesis testing is less reliable. Alternatively, we used the one-step estimator in our regressions and found similar results.

of the instruments and did not reveal any evidence for a second order serial correlation in the error term.[21]

In two separate sets of regressions, we measure to what degree the negative relationship between judicial capacity and economic fluctuations is determined by the trends in judicial capacity that are common across states or by cross sectional differences, and whether the results are robust to using different time horizon in measuring economic fluctuations. To remove the common trends in judicial capacity, we measure the turnover ratios as deviations from the national average. Therefore any change in the turnover ratio, perhaps due to a legislative act that is common for every state would be accounted for using this strategy. The results reported in the second column similarly indicate a negative relationship between judicial capacity and economic fluctuations. We should, however, note that the relationship is weaker and less significant, and thus the impact of the common trends in judicial capacity may not be negligible. In our baseline regression, we used a 1 year horizon to measure economic fluctuations. It is, however, common knowledge that there is a considerable variation in the duration of business cycles. We therefore check the robustness of our results to using 2 and 3 year horizons to measure economic fluctuations. The results reported in the last two columns of Table 3 are similar to our baseline results.[22]

Other judicial characteristics

The policy implication so far is that an increase in the rate at which bankruptcy cases terminated can mitigate business cycles. In Section 2 we mentioned two reasons why courts can

[21] The p-values are reported at the bottom of Table 3.

[22] We used 2 and 3 year rolling windows in constructing the dependent and the independent variables to obtain the results in the third and the fourth columns of Table 3. To account for the serial correlation generated by this methodology, we included 2 and 3 lags of the dependent variable on the right hand side. The numbers in parentheses for the lags of income fluctuations are the F-statistics that test for the joint significance of these coefficients.

turnover cases faster, i.e., efficiency and judicial resources. Alternatively in this section, we focus on laws that are related to bankruptcy and measure to what extent the differences in these laws across states and time can determine the negative relationship between turnover rates and economic fluctuations.

One reason why the differences in these laws can affect the case turnover disparity observed across states is because they can affect the type of individuals that declare bankruptcy. Specifically, studies such as Lefgren and McIntyre (2009) and Miller (2011) find that the type and the number of bankruptcies filed may depend on the Wage Garnishment laws and Married, Homestead and Personal Exemption laws that vary across states. These studies find that high exemption levels and high wage garnishment rates prompt high-income and low-income households to file for bankruptcy and this disparity is an important determinant of the case turnover variation observed across states. It is also argued that the differences in the laws generate differences in the rate at which households, in general, declare bankruptcy since an important share of bankruptcies are due to a strategic choice where households react to the financial benefits of bankruptcy, rather than an outcome of unintended economics consequences such as a job loss (e.g. Fay et al., 2002; White, 2009; Fisher, 2005). Below we test whether the cross-state differences in these laws are an important determinant of the negative relationship between turnover rates and economic fluctuations.

An important piece of legislation that had a profound effect on bankruptcy decisions during our sample period is the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) of 2005. It is thus important to determine the implications of this legal shock for our analysis. However, we should note that it is unclear how this shock is expected to affect the turnover ratios and their negative relationship to economic fluctuations. Although the act introduced stringent criteria for filing bankruptcy, it is agreed that it made the bankruptcy process more burdensome for the judicial system. Moreover, a large portion of the period in which the law was in effect coincides with the Great Recession and thus it is difficult to identify the independent contribution of the law to the relationships tested in this paper. Finally, in our empirical analysis above, when we accounted for the time specific shocks to turnover rates that are common across states, including the BAPCPA, by measuring the ratios as deviations from the national average, we found similar results. Nevertheless, below we consider the periods before and after the BAPCPA to determine whether the relationship between turnover ratios and economic fluctuations is different in these two sample periods.

In this section we use data from Lefgren and McIntyre (2009) to construct the dummy variables that capture the differential levels of wage garnishment and exemptions across states. The states, in which the level of disposable income that can be garnished is less than $300 per week are categorized as high-wage-garnishment states and others as high-wage-garnishment states. The low wage garnishment states have federally mandated restrictions and permit only a “low” or even a negligible fraction of household disposable income. The exemption data includes personal property and homestead exemptions for married couples for each state in the United States. We consider both property exemptions and homestead exemptions separately in our analysis. Two dummy variables are constructed for personal property exemptions: exemptions below $20,000 (low-exemption-states) and greater than $40,000 (high-exemption-states). Similarly the homestead exemptions variables are for states that have exemptions below $30,000 (low-exemption-states) and greater than $100,000 (high-exemption-states).

The results are displayed in Table 4. The most central finding is that the relationship between the turnover ratio for each classification and time period is negative and the classifications based on exemptions and garnishments and the BAPCPA have a small effect on the magnitude of the turnover ratio coefficients. These results suggest that the cross-state differences in the type of individuals (high-income and low-income) that file for bankruptcy and the BAPCPA may not be as important as other aspects of judicial institutions such as the efficiency of the bankruptcy courts and the availability of judicial resources.

5. Concluding remarks

In this paper we constructed a partial equilibrium framework that includes frictions in financial markets. The key innovation we made was to link the level of these frictions to the capacity of the judicial system so that the higher capacity to resolve bankruptcy cases implied lower levels of financial frictions. In this model economic shocks, besides affecting output/income directly, had an indirect effect by increasing and decreasing the number of bankruptcies and making judicial capacity more and less binding for the credit markets, respectively. We demonstrated that this indirect channel of transmission was stronger in economies with low judicial capacity and predicted that shocks that increase output and considerably decrease the number of bankruptcies at the same time (if bankruptcy is strongly countercyclical) are amplified by more through the judicial process (the source of financial frictions) and that economic fluctuations are more severe in these economies. Similarly, we found that if bankruptcy is procyclical, shocks are mitigated by more in economies with low judicial capacity and thus economic fluctuations are less severe. In the second half of the paper, we found aggregate and bank-level evidence showing that bankruptcy is countercyclical. Consistent with this result, we the found that economic fluctuations are less severe in states with high case turnover ratios (high judicial capacity).

Our paper is related to the broad literature that identifies the interaction of borrower balance sheets and financial frictions as an important determinant of the amplitude of output response to economic shocks (e.g. Bernanke et al., 1999). We complement this literature by emphasizing judicial capacity as a main determinant of financial frictions. This emphasis allows us to draw inferences that are different from the literature. Unlike the usual result in costly-state verification models, we find for example that higher levels of financial frictions do not always generate higher economic fluctuations. Specifically, we find that if shocks have a procyclical effect on bankruptcy, output response can be larger in economies with lower levels of financial frictions. However, since we find that, on aggregate, bankruptcy is countercyclical, the policy implications of our results is that increasing the capacity of the judicial system, either regionally or nationally, would decrease financial frictions. Faced with lower frictions (higher recover rates), banks' sensitivity to borrower balance sheets would then decrease and the decrease in the strength of shock transmission through borrower balance sheets would generate smaller fluctuations in output.

The analysis in this paper can be extended in two directions. First, given the negative link between short term macroeconomic volatility and the accumulation of factors of production and technology, it would be interesting to determine if there is any significant relationship between regional judicial capacity and long-term growth (e.g. Levine, 1999). Second, more detailed policy implications can be drawn by identifying regional output responses to macroeconomic shocks such as monetary policy, fiscal policy, asset-price shocks separately and by investigating how these responses are related to the regional judicial capacity.

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Appendix A. Data

Table A.1. Data sources and description

Variables		Source
Bankruptcy cases filed, terminated and pending		U.S. Federal Courts, Case load statistics, December-December
State personal income		BEA, quarterly, converted to real dollars using the GDP deflator.
% manufacturing, real estate&finance, agriculture & mining		BEA. Computed by using State-level GDP data.
Bad loans		The sum of loans not accruing (RCFD1403) and loans over 90 days late (RCFD1407).
liquid-to-total-assets-ratio		Up to 1993:Q2, liquidity is the sum of total investment securities (RCFD0390), RCFD1350, and assets held in trading account (RCFD2146). From 1993:Q3 trhough 2010:Q4, liquidity is measured as the sum of RCFD1350, securities held to maturity (RCFD1754), and trading assets (RCFD3545). Liquidity is then divided by total assets (RCFD 2170) to obtain the ratio.
equity ratio		The ratio of total equity capital (RCFD 3210) to the sum of all assets (RCFD 2170).
liquid-to-total-assets-ratio, Bank Holding Company		The same as bank variables. The acronyms are BHCK instead of RCFD.
wage garnishment, married homestead and personal exemptions		Lefgren and McIntyre (2009)

Appendix B

Table B.1. Descriptive statistics

State	economic fluc.	turnover	married personal exemption	married homestead exemption	wage garnishment
Alabama	0.026	0.360	medium	low	low
Alaska	0.029	0.487	medium	high	high
Arizona	0.031	0.456	low	high	low
Arkansas	0.031	0.405	medium	low	low
California	0.031	0.575	high	medium	low
Colorado	0.040	0.513	low	medium	low
Connecticut	0.037	0.594	high	medium	low
Delaware	0.033	0.300	medium	low	high
DC	0.052	0.510	medium	medium	low
Florida	0.029	0.467	low	high	high
Georgia	0.026	0.392	low	low	low
Hawaii	0.024	0.590	high	medium	high
Idaho	0.036	0.515	medium	medium	low
Illinois	0.028	0.527	low	low	high
Indiana	0.029	0.483	low	low	low
Iowa	0.035	0.617	medium	high	low
Kansas	0.034	0.397	high	high	low
Kentucky	0.025	0.524	low	low	low
Louisiana	0.037	0.372	high	medium	low
Maine	0.026	0.581	medium	low	low
Maryland	0.023	0.498	low	low	low
Massachusetts	0.032	0.548	medium	high	low
Michigan	0.033	0.477	medium	medium	low
Minnesota	0.029	0.511	high	high	low
Mississippi	0.034	0.413	medium	high	low
Missouri	0.028	0.497	low	low	high
Montana	0.030	0.489	medium	high	low
Nebraska	0.037	0.482	low	low	high
Nevada	0.039	0.405	medium	high	low
New Hampshire	0.036	0.523	medium	medium	low
New Jersey	0.034	0.486	medium	medium	high
New Mexico	0.029	0.629	high	medium	low
New York	0.045	0.492	low	low	high
North Carolina	0.030	0.378	low	low	high
North Dakota	0.050	0.625	low	high	low
Ohio	0.025	0.460	low	low	low
Oklahoma	0.048	0.531	high	high	low
Oregon	0.028	0.533	high	medium	low
Pennsylvania	0.025	0.501	medium	medium	high
Rhode Island	0.029	0.644	medium	high	low
South Carolina	0.027	0.363	low	low	high
South Dakota	0.049	0.536	low	high	high
Tennessee	0.024	0.377	medium	low	low
Texas	0.039	0.404	high	high	high
Utah	0.034	0.440	low	medium	high
Vermont	0.031	0.504	medium	high	high
Virginia	0.024	0.480	high	low	low
Washington	0.053	0.537	medium	medium	low
West Virginia	0.024	0.577	medium	low	high
Wisconsin	0.027	0.536	medium	medium	high
Wyoming	0.052	0.501	medium	low	low

Note: Economic fluctuations are measured by the annual average of quarterly deviations of real state income from its long-run trend (measured using the HP filter). The turnover ratio is measured as the number of cases terminated in a given year (December to December) divided by the sum of the number cases pending at the beginning of the year and the number of filings during the year. The remaining variables are obtained from Lefgren and McIntyre (2009).

Table 1. Income growth, bankruptcy case load correlations

	period		Filings		Terminations		Pending	
			National	State level	National	State level	National	State level
Income growth: HP-filter	2000-2010	current income growth	-0.436	-0.216	-0.449	-0.196	-0.350	-0.178
		income growth, lag 1	-0.354	-0.213	-0.336	-0.207	-0.378	-0.179
	2001		-0.803	-0.153	-0.484	-0.138	-0.772	-0.164
	2007-2010		-0.966	-0.272	-0.998	-0.263	-0.979	-0.243
Income growth: % change	2000-2010	current income growth	-0.499	-0.1894	-0.432	-0.175	-0.445	-0.134
		income growth, lag 1	-0.531	-0.1892	-0.569	-0.202	-0.546	-0.149
	2001		-0.879	-0.135	-0.602	-0.125	-0.853	-0.147
	2007-2010		-0.747	-0.252	-0.878	-0.256	-0.751	-0.173

Note: This table reports pairwise correlations of bankruptcy cases filed, terminated and pending with economic activity both at the national and state level. The results in the top and bottom panel are obtained by using the HP filter and log differences to measure real income growth during the sample period, respectively.

Table 2. Loan default and economic fluctuations, bank level evidence

	Whole Sample	Large banks	Small banks	Excluding crisis/recession periods
lags of bad loans	-0.009	-0.056	-0.010	-0.005
	(0.680)	(2.167)*	(0.651)	(2.115)*
Income	-0.027	-0.075	-0.007	-0.019
	(3.138)**	(1.300)	(2.935)**	(3.258)**
Bank liquidity	-0.274	-0.251	-0.277	-0.224
	(32.650)***	(54.08)***	(31.99)***	(28.96)***
Bank equity	0.282	0.107	0.268	0.231
	(2.189)*	(0.420)	(1.944)*	(3.217)**
BHC size	0.043	-0.211	0.0468	0.0861
	(5.484)***	(3.325)**	(5.537)***	(4.803)***
BHC liquidity	0.000	0.0735	0.000	-0.001
	(0.18)	(11.29)***	(0.177)	(0.230)
Number of obs.	130,370	3,607	126,770	107,928
Adjusted R-sq	0.002	0.020	0.002	0.002

Note: This table reports the results obtained from the estimation of equation (11). The F-statistics in parentheses test for the joint significance of the coefficients. * significant at 10%; ** significant at 5%; *** significant at 1%. Bank that are in the top 5 percent of the size distribution in a given quarter are classified as large banks in that quarter. Following the Business Cycle Dating Committee (NBER), we exclude the periods 2007:Q3 -2009:Q2, 2001:Q1-2001:Q3, 1990:Q3-1991:Q1, 1983:Q3-1984:Q4 to consider periods not characterized by a recession or a crisis.

Table 3. Economic fluctuations and the case turnover ratio

	Baseline	Turnover ratio deviations	2 Year Cycle	3 Year Cycle
lag(s) of income fluctuations	0.333	0.435	0.484	0.942
	(0.075)***	(0.076)***	(273.83)***	(406.12)***
turnover ratio	-0.110		-0.051	-0.029
	(0.017)***		(0.01)***	(0.007)***
turnover ratio, deviation		-0.090		
		(0.047)*		
% manufacturing	0.303	0.186	0.092	0.075
	(0.056)***	(0.053)***	(0.04)**	(0.019)***
% real estate & finance	0.278	0.117	0.174	0.061
	(0.044)***	(0.036)***	(0.023)***	(0.016)***
% agriculture & mining	-0.016	-0.158	-0.011	0.005
	(0.051)	(0.056)***	(0.03)	(0.014)
Number of observations	510	510	306	306
Arellano-Bond test for AR(2)	0.573	0.961	0.661	0.433
Hansen test	0.644	0.147	0.406	0.288

Note: This table reports the results obtained from the estimation of equation (12). * significant at 10%; ** significant at 5%; *** significant at 1%. The turnover ratio deviations are measured as the difference between a state's turnover ratio and the national average. Economic fluctuations that are used to obtain the results in columns 3 and 4 are measured over a 2 and 3 year time horizon, respectively. The F-statistics (in parentheses) reported in columns 3 and 4 for the lags of income fluctuations test for the joint significance of these coefficients.

Table 4. Institutional characteristics and the income fluctuations - turnover ratio relationship

	Personal Homestead Exemption		Married Homestead Exemption		Wage Garnishment		BAPCPA	
	low	high	low	high	low	high	after	whole sample
income fluctuations lag	0.326	0.386	0.256	0.308	0.312	0.206	0.153	0.333
	(0.078)***	(0.087)***	(0.09)***	(0.101)***	(0.091)***	(0.094)**	(0.108)	(0.075)***
turnover ratio	-0.093	-0.092	-0.123	-0.091	-0.089	-0.094	-0.140	-0.110
	(0.018)***	(0.017)***	(0.02)***	(0.016)***	(0.018)***	(0.019)***	(0.043)***	(0.017)***
% manufacturing	0.245	0.234	0.240	0.251	0.285	0.190	0.480	0.303
	(0.052)***	(0.054)***	(0.054)***	(0.05)***	(0.066)***	(0.052)***	(0.233)**	(0.056)***
% real estate & finance	0.246	0.248	0.283	0.235	0.220	0.281	0.116	0.278
	(0.046)***	(0.04)***	(0.045)***	(0.0393)***	(0.053)***	(0.037)***	(0.199)	(0.044)***
% agriculture & mining	-0.001	0.009	0.072	0.020	-0.004	0.059	-0.057	-0.016
	(0.043)	(0.036)	(0.035)**	(0.0387)	(0.056)	(0.027)**	(0.093)	(0.051)
Number of obs.	400	340	320	350	330	180	255	510
Arellano-Bond test for AR(2)	0.465	0.571	0.856	0.205	0.574	0.389	0.153	0.573
Hansen test	0.508	0.731	0.248	0.793	0.893	0.951	0.569	0.664

Note: This table reports the results obtained from the estimation of equation (12) for the different categories of state-specific judicial variables displayed in Appendix B.