Investment, Credit Rationing, and the Soft Budget Constraint:
What Would a Well-Functioning Credit Market Look Like?

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Abstract: IV estimates of the link between profits and investment in the Czech Republic find a complex relationship. While firms may occasionally be credit rationed or face soft budget constraints, investments generally flow to industries with greatest profit potential or recapitalization need.

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A long line of studies have investigated the link between possible capital market imperfections and investment behavior. In the transition context, Lizal and Svejnar (2002) investigated the relationship between sales, profits and investment in the post-communist Czech Republic between 1993 and 1998. They find that lagged output is positively related to investment, while for some types of firms in some periods greater profits also lead to greater investment.

Instrumental Variables (IV) estimates of this relationship, however, find a much more complex pattern. While some firms in some years may be credit rationed or subject to soft budget constraints, many of the results are more consistent with investments being directed to targets of opportunity including industries with the greatest profit potential or most need of recapitalization.

The result regarding output (sales) can be interpreted in the context of accelerator models, but the lack of a relationship between profits and investment is problematic. Lizal and Svejnar suggest

a) a positive coefficient is “an indication that firms are credit rationed because, in a perfect capital market, the firm and lender would be indifferent between internal and external financing and the coefficient on profit would be zero (p. 361),” while

b) a zero coefficient “signals that firms have access to bank credit for investment independent of their profitability.... [and] this nondiscriminatory supply of bank funds to firms signals the presence of a soft budget constraint for poorly performing firms (p. 361),” and a negative coefficient suggests a stronger form of soft budget constraint where failing firms have greater access to credit.

Lizal and Svejnar thus divide firms into two types: credit rationed or facing a soft budget constraint, according to whether the sum of the coefficients of four lags of profits is positive or not (p. 369). The problem with this analysis is that it leaves no space for a
normal, well-functioning capital market. We are led to ask: “What pattern of coefficients would support a conclusion that the capital market was performing its proper function, allocating scarce investment capital to firms where it would be most productive?”

Controlling for sales, high profits suggest that a firm has a higher than normal rate of return and represents an attractive investment opportunity. Using OLS estimates there is no way to distinguish whether a positive relationship between firm profits and investment means that more profitable firms have greater access to internal investment capital (credit rationing) or offer more attractive investment opportunities to all types of capital (excess returns). An easy modification may provide evidence on this relationship. If economic prospects are correlated across firms in an industry, the profits of other firms in an industry are valid instruments that remove the effect of firm-specific credit rationing. If firms invest more when other firms in the industry are profitable, this raises the possibility that the effect is a response to opportunity.

Instrumental variables estimates also provide insight into the importance of soft budget constraints. If firms invest more when other firms in the industry perform poorly, then the results are unlikely to be due to soft budget constraints. Rather, they raise causality issues. Suppose that some industries required more extensive restructuring to compete in world markets. These industries should exhibit low profits during restructuring while undertaking unusually large investment programs.

Table 1 contains estimates from Table 7 of Lizal and Svejnar as well as the results instrumenting firm profits in a given quarter by the mean profits of all other firms in the same industry for that quarter, independent of ownership type. Lizal and Svejnar use four lags of firm profits. Instrumenting four lags using four lags of profits for other firms in the same industry as instruments for each of nine ownership types (plus all firms combined) and six

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1 For recent examples see Gomes (2002) and Erickson and Whited (2000). Earlier literature is surveyed in Fazzari et. al (1988).

2 To the extent that credit rationing is associated with industries rather than firms, the effect will remain.
years yields 960 coefficients in 240 equations, far too many to report here. Table 1 reports
the $R^2$ for the IV equations for the first lag of profits. These provide strong evidence that the
instruments are valid, with the unweighted average $R^2$ across all 60 equations equaling 0.58.
Furthermore, the quality of the instruments improved over time, with the average $R^2$ across
the nine ownership types increasing from 0.46 in 1993 to 0.71 in 1998. Similar levels of
significance and time-patterns hold for the other three lag lengths.

In Table 1 $\Sigma \gamma_k$ is the sum of the coefficients on output lagged for four quarters while
$\Sigma \beta_k$ is the sum of the coefficients on profits. We have indicated by shaded bold italics cases
where the instrumental variable (IV) estimates of the effect of profits on investment are
significantly different, at the five percent level, from the ordinary least squares estimates.
Lack of a significant difference means that the firm’s own profit does not affect investment
beyond what is common to the industry and suggests that the estimated profit effect is related
to investment opportunity or industry wide factors rather than firm specific effects including
lack of access to credit markets. A significant difference between the two estimators,
however, is consistent with both firm-specific credit rationing or a soft budget constraint and
with firm-idiosyncratic profit opportunities such as might arise from patents or unique
command of resources.

The pattern of results is mixed but careful examination reveals several key points.
While there are eight company-type/year pairs where there is a significant difference between
the OLS and IV estimates, in four of these the IV estimates are greater than the OLS
estimates, a result that is inconsistent with either the credit rationing or the soft budget
constraint stories. Among the fifteen significant positive relationships between profits and
investment that Lizal and Svejnar interpret as indicating possible credit rationing, in only one

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3 We use 17 industries at the two-digit level (i.e. the level of aggregation is firms in food processing or
chemicals).
4 They are available at http://home.cerge-ei.cz/hanousek/investment.
5 The average weighted by sample size shows an even more marked increase, from 0.21 in 1993 to 0.73 in 1998.
6 The test is a conventional Hausman test for difference in the set of coefficients $\beta_k$ for $k = 1$, (Hausman, 1978),
$W = (\beta_{OLS} - \beta_{IV})^T (VAR(\beta_{OLS}) - VAR(\beta_{IV}))^{-1} (\beta_{OLS} - \beta_{IV}) \approx \chi^2(k) = \chi^2_{(1)}$. 
case (private, limited companies in 1997) was there a significant difference between the OLS and IV estimates, with the IV estimates being lower and insignificant. Three other cases (cooperatives in 1993 and 1995 and private, limited companies in 1995) suggest credit rationing, although large standard errors mean that estimated IV and OLS coefficients are not significantly different. In each case, the significant positive set of coefficients in the OLS estimates becomes negative and insignificant when the IV estimator is used to remove the effect of the firm’s own profits but retain the investment attractiveness of the industry in general.

While, as discussed above, such a pattern might represent idiosyncratic opportunities available to these firms, given the types of firms involved it is likely that this difference in coefficients indicates credit rationing. Cooperatives were generally linked with agriculture and many were expected to go out of business during the transition, a fact born out by the substantial reduction in the number of such firms over the course of the sample from 215 in 1993 to 103 in 1998. The lack of any impact on the significant positive coefficients for cooperatives when firm-specific profit effects are eliminated though the use of IV estimators in the last two years studied strongly suggests that the apparent credit rationing in the early years of transition may, in fact, indicate rational risk assessment by banks who refused to lend to firms that were destined to fail. Once the industry had settled down by 1996, there remains no evidence of credit rationing for these firms.

Indeed, the same can be said in general. With the exception of state-owned enterprises in 1997, there is little or no suggestion that individual firms are credit rationed in any ownership-type group in the last two years under study, when the instruments perform best. The apparent anomaly of state-owned enterprises is easily understood. By 1997 the Czech banking system was in crisis and was being prepared for privatization. State-owned firms no longer had access to soft money from this source. At the same time, they were yet to be privatized and their future was highly uncertain. Thus, it is not surprising that such firms
would also not have ready access to debt or equity markets and would find themselves dependent on retained earnings for capital expenditures. With this one exception, however, the pattern of results is consistent with the Czech capital market using profits as a signal of attractive investment opportunities, at least in late transition and inconsistent with credit rationing except at the industry-wide level.

We also note that, of the ten significant negative relationships that Lizal and Svejnar interpret as supporting the strong form on the soft budget constraint, only three (private individuals in 1993, state owned enterprises in 1996 and mixed, joint stock companies in 1996) are significantly less negative in the IV estimates. As discussed above, a pattern whereby firms invest more when others in their industry are performing poorly could easily be interpreted as suggesting an industry in need of restructuring even without soft budget constraints. This would create the negative relationships observed for some types of firms, especially private, joint stock companies in 1997 and 1998 by which time serious restructuring was underway in the Czech economy.

How well the Czech capital market was functioning is most easily seen in the results for all firms combined. While at the start of transition these coefficients vary considerably across years and between the OLS and IV estimates, by the later years (1997 and 1998) the relationship between profits and investment is consistently positive in both the OLS and IV estimates, suggesting that, rather than lacking access to credit, Czech firms are more able to attract investment capital when they offer attractive investment opportunities.
REFERENCES


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* significant at 10% level, ** significant at 5% level, *** significant at 1% level

Note: Table 1 presents OLS and IV estimates of the investment equation. The table includes coefficients for various specifications, along with standard errors in parentheses. The table covers different years, with columns for different types of investment and ownership structures.