Taxes and Growth in a Financially underdeveloped country: Evidence from the Chilean Investment Boom, by Hsieh and Parker

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In 1982, Chile experienced its largest recession since the Great Depression. Between 1981 and 1983, real GDP declined in about 15 percent, unemployment increased from 10 to around 20 percent, and investment plummeted from 23 to 10 percent of GDP. Despite the magnitude of the crisis, output, and specially investment recovered surprisingly fast, with the latter reaching its pre-crisis levels 3 years after the crisis, and increasing to reach about 25 percent of GDP at the end of the decade. There has long be a consensus in Chile that this investment boom was largely responsible for the performance of the economy after the crisis but more controversy on the causes of the investment boom. The paper by Hsieh and Parker argues that this boom was largely the result of the tax reform introduced in Chile in 1984, which among other things reduced the tax on retained earnings, and that this finding provides evidence that this type of taxation is specially harmful in economies with underdeveloped financial markets. The paper thus provides not only a possible explanation for Chile's investment boom, but also exploits the Chilean case to provide evidence of the impact of the tax system across different types of firms and of the importance of financial constraints.

Although I agree with the broad argument of the paperthere are two issues that may affect the extent to which the evidence supports its hypothesis and quantitative conclusions.. First, during the period of analysis Chile engaged in multiple structural and policy reforms, which difficults the isolation of the impact of any individual one. Second, at the time of the tax reform Chile was just starting to recover from a big recession, which means that cyclical effects are a potential concern. I will structure the rest of my discussion around these two issues.

The case of Chile

Chile was a pioneer in the introduction of a series of market-oriented reforms among developing countries. During the 1970s and 1980s, Chile unilaterally reduced and simplified the existing system of tariffs, privatized a large number of state banks and companies, opened the capital account, and moved from an unfunded defined-benefit to a fully-funded defined contribution pension system , just to name a few. This abundance of reforms has long put Chilean economists on an "embarrassment of riches". On the one hand, Chile looks as the perfect laboratory to study the impact of a set of structural reforms that are relevant for developing countries. On the other hand, the bunching of reforms around a relatively short period of time makes it hard to separately identify the impact of each individual one.

This paper deals with the identification problems created by this abundance of reformsin two ways. First, it argues that the specific timing of the investment boom and other variables is unlikely to result from three major structural reforms undertaken in the 80s: the pension funds reform, the liberalization of the financial markets, and trade liberalization. Second, it exploits the theoretical prediction that the tax reform should have specially stimulated the investment of firms and sectors that were more financially constrained.

Although the discussion in the paper probably covers the most important *structural* reforms experienced by Chile around 1984, this is also a period of some important changes in the conduction of macroeconomic policy. For example, the exchange rate regime suffered radical changes that resulted in a large depreciation of the nominal and real exchange rate: between 1982 and 1986 the peso lost half its value (43 percent between 1984 and 1986). Thus, the timing of the reform coincides with the depreciation and, to the extent that this depreciation restored the international competitiveness of some Chilean firms, it could account for at least part of the investment boom attributed to the tax reform.[1] After the crisis Chile also entered in and structural adjustment program with the IMF and the World Bank that imposed changes in the conduction of fiscal and monetary policy, and real wages declined in about 20 percent, all of which could have affected the investment rate. Moreover, several of these changes can arguably have heterogeneous impacts on the investment rates of different industries and thus contaminate the industry level evidence unless properly controlled for.[2]

In summary, although the evidence presented in the paper is certaily consistent with its main hypothesis and makes for a convincing case, the miriad of changes happening in Chile during this period makes it difficult to quantify the real importance of the tax reform for the investment boom versus alternative explanations with the available data, and some degree of skepticism with respect to the specific magnitudes reported in the paper is probably healthy.

[1] In his review of the determinants of the Chilean saving boom, Morande (1998) (Savings in Chile: What Went Right? *Journal of Development Economics,* 57, 201-228.) argues that some tradable sectors could have been significantly benefited from the real depreciation to induce them to save and invest. Meller (1996) (Un Siglo de Economia Politica Chilena (1890-1990), Editorial Andres Bello, Santiago, Chile, 1996) also argues that the persistent depreciation helped the expansion of the exporting sector.

[2] The paper deals with the possibility that the international competitiveness of external dependent industries coul increase relatively more as a result of the real depreciation by controlling in the regressions for the net exports of an industry before the recession. Although it is not completely clear that industries that had higher net exports with an appreciated currency should experience the largest increases in competitiveness, this approach partly eases this type of concern. However, this approach does not controls for the possibility that more externally dependent sectors could have had lower levels of dollar denominated debt (according to Meller (1996, op.cit.) 50 percent of bank loans were denominated in dollars before the recession).

The Cycle

The tax-reform analyzed in the paper was passed in the middle of the worst recession Chile has experienced since the Great Depression. Thus, it is legitimate to ask to what extent the investment patterns documented in the paper are typical of the recovery phase of a big recession. I will argue that this is a relevant concern by focusing on the implications of the cyclicality for both the aggregate and sectoral evidence provided in the paper.

Determining the extent to which the pattern of investment documented in the paper can be attributed to a cyclical phenomenon requires to compare this episode with other relevant benchmarks. There are two options ; comparing it with the pattern observed in other Chilean recessions (within-country benchmark), or with similar episodes observed in other countries (cross-country benchmark).

Figure 1 compares the cyclical pattern of investment during the last three Chilean recessions (1975, 1983, and 1999). Panel A shows the evolution of investment levels in each of these episodes normalizing the trough of the investment cycle to 100 and makes apparent that the depth of the 1983 recession is special: the contraction (and recovery) of investment is much larger than in other episodes. To compare the patterns, however, it is better to normalize by the size (peak-trough) of the recession. This is done in Panel B, which shows that the pattern observed in the 1983 recession is similar to the one seen in 1975, although clearly different from the much milder 1999 recession. All in all, these comparisons show that the decline and recovery in investment seen in 1983, although more pronounced, exhibits a pattern that is not unseen in other Chilean recessions.

It might be argued, however, that given the size of the 1983 recession and its systemic characteristics, the milder Chilean episodes discussed above do not provide a relevant benchmark. If large, systemic crises are special, one may want to compare this episode with other "similar" crises instead. This is done in Figure 2, which compares the cyclical behavior of investment Chile 1983 and 22 cases of systemic output collapses as identified by Calvo et al. (2006).[3] Compared to the average episode, the recession experienced by Chile in 1983 is larger but the overall pattern is similar: two years after the trough real investment has recovered about half of its initial value (43 percent in Chile versus 35 percent in the average episode).

A final aspect of the Chilean episode thath could be special is the financing of investment through retained earnings. Although it would be interesting to look at the sectoral patterns of corporate versus household savings in other episodes, we typically lack the required data. However, existing data strongly suggests that the use of retained earnings (and other internal sources of liquidity) may not be uncommon. As shown by Calvo et al. (2006)[4] the recoveries observed in these episodes are typically "creditless". Given that in these episodes international credit is minimal by construction, and the intermediated credit flattens-out, the only potentially meaningful source of funds to finance an increase in investment is retained earnings.

[3] Phoenix Miracles in Emerging Markets: Recovering without Credit from Systemic Financial Crises, NBER Working Paper 12101.

[4] Ibid.

Overall, the evidence suggests that the Chilean recession is more special in terms of its size than in terms of its pattern, and provides some support to the idea that at least part of the "investment boom" documented in the paper can be a cyclical phenomenon. Of course, this does not mean that the tax reform played no role, and it is likely that the somewhat faster recovery observed in Chile could be consequence of this reform, but from a quantitative point of view, attributing the whole increase in investment and corporate savings to the reform is probably misleading.

The cyclicality issue may also affect the sectoral evidence presented in the paper. In a recent paper, Braun and Larrain (2005)[5] have documented that recessions affect relatively more those industries that are more dependent on external finance, especially so in financially underdeveloped countries (which is the flip-side of the evidence provided by Hsieh and Parker). The evidence provided in Braun and Larrain's paper comes from a large panel of countries, so it corresponds to a systematic characteristic of the pattern of cyclical fluctuations across industries. Hence, the pattern of industrial recoveries documented in this paper, while consistent with the hypothesis that the tax reform eased financial constraints for some firms, is also consistent with the typical pattern of cyclical recovery of industries. Determining whether the Chilean tax reform accentuated this cyclical pattern and quantifying its contribution,is a difficult task, but a back-of-the-envelope calculation suggests that the size of the investment increase documented in this paper is consistent with Braun and Larrain's estimates.[6]

The cyclicality issue is also a problem for the firm level evidence provided in the paper. This evidence indicates that firms that are more likely to be financed constrained, based on ex-ante measures of investment-cash-flow correlations, increased investment relatively more after the reform. While this is certainly consistent with the differential effect of the tax reform, the literature on the credit channel has shown that financially constrained firms experience higher cyclical fluctuations in their investment, output, and employment resulting from the cyclicality of the external financial premium (Gertler and Gilchrist, 1994; Kashyap, Lamont, and Stein, 1994; Oliner and Rudebush, 1996; Sharpe, 1994, among others).[7] An additional issue is that the paper measures a firm's degree of financial constraints by the correlation between investment and cash-flow during the contraction phase of the recession instead of "normal times". Although the paper argues that firms that can

[5]Finance and the Business Cycle: International, Inter-Industry Evidence, *Journal of Finance*, 60 (3), 1097-1128.

[6]Braun and Larrain estimate that during normal times firms in a sector at the 75th percentile of external dependence grow 1.5 percent faster than firms in an industry at the 25th percentile of external dependence. Assuming for a back-of-the-envelope calculation that capital share in Chile is about 0.5 (from Chumacero and Fuentes (2005), "On the determinants of Chilean economic growth", in "General Equilibrium Models for the Chilean Economy". R. Chumacero and K. Schmidt-Hebbel, eds. Banco Central de Chile.), no depreciation, no TFP growth, and a common increase in employment of 7.5 percent (corresponding to the average for 1984-89), this estimate would be consistent with a relative increase in investment of about 3.4 percent. In Hsie and Parker, investment in high external dependent industries is about 2 percent higher than in low external dependent industries during the recovery period (obtained considering an interquantile range of external dependence of about 0.6 and the average differential investment rate after 1984 of 3 percent).

[7]Respectively: Monetary Policy, Business Cycles, and the Behavior of Small Manufacturing Firms, *Quarterly Journal of Economics*, 109, 309- 340; Credit Conditions and the Cyclical Behavior of Inventories, *Quarterly Journal of Economics*, 109 (3), 565-592; Is there a Broad Credit Channel for Monetary Policy, *FRB San Francisco Economic Review,* 1, 3-13; and Financial Market Imperfections, Firm Leverage, and the Cyclicality of Employment, *American Economic Review,* 84, 1060-1074.

still invest while their income is shrinking are likely to have good access to external funds, these may also be firms with higher initial levels of internal and working capital (see Fazzari and Petersen (1993)),[8] higher costs of stopping current investment projects, or more able to postpone payments to suppliers to obtain liquidity.[9/10]

The arguments presented above suggest that at least part of the increase in investment documented in the paper at the aggregate, sectoral, and firm level, could correspond to a cyclical phenomenon. Admittedly, the Chilean investment boom persisted for almost a decade, which is beyond business cycle frequencies. However, there are two important considerations associated with the cyclicality issue. First, attributing the whole short-run expansion in investment to the reform would overestimate its overall impact even if the medium run expansion were completely caused by it. Second, considering the possibility of cyclical effects would lead us to re-frame the question and ask why the boom persisted beyond 1986. While the 1984 tax reform is a possibility, some of the arguments used to disregard alternative explanations based on the specific timing of the reform and the investment boom do not apply well to this new question.

Final remarks

Hsieh and Parker have written a very interesting paper. They address a difficult problem and present a compelling and thought-provoking argument in a clear and well reasoned manner that should be given serious consideration. However, as I have discussed above, there are some remaining issues that can affect the interpretation of the results, if not qualitatively, at least quantitatively. Although many of these issues cannot be properly addressed within the context of this paper, it is important for the reade to beware before forming her opinion.

Another issue that arises from this discussion is the extent to which we can extrapolate the results from the Chilean experience to other countries. As mentioned above, Chile was particular along several dimensions when the tax reform took place. The authors recognize this issue by qualifying their statements as applying to an economy with "sound macroeconomic environment", but this does not completely covers the particularities of the Chilean case. So, at least from a quantitative point of view we must be careful in generating false expectations for countries willing to undertake these type of measures.

Finally, the desirability of a reform like the one described here also has to take into account the potential costs associated with it. At least in the short run, a reduction in taxes will reduce government revenue, which may decrease government savings (compensating the aggregate impact

[8] Working Capital and Fixed Investment: New Evidence on Financing Constraints, *RAND Journal of Economics*, 24 (3), 328-342.

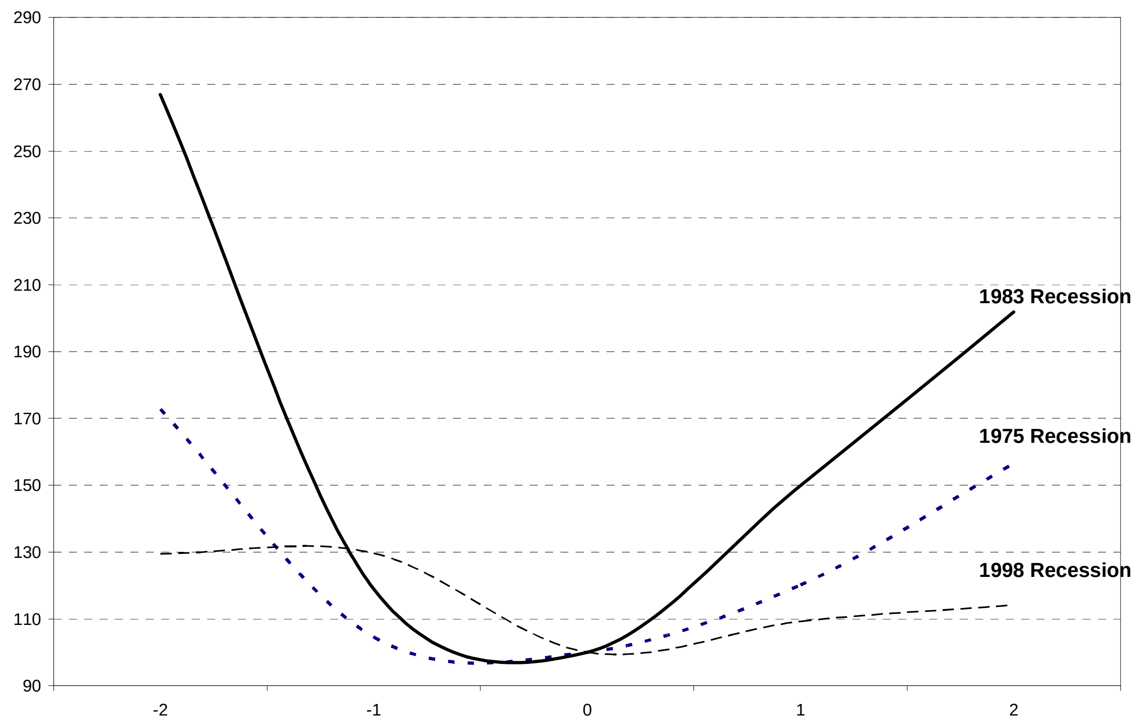
[9] There are some other issues with the measure of financial constraints in the paper that have to do with the fact that the investment-cash flow correlations seem to be calculated with only three years of data and without controlling by investment opportunities by using the Tobin's Q as it is standard in the literature.

[10] Another option is that the correlation between profits and investment may just reflect differences in expectations across firms. Firms that expected a prolonged recession may have decided to adjust their desired levels of capital. If, after the fact, these pessimistic firms are forced to adjust their expectations and their desired levels of capital upwards we could reproduce the patterns documented in the paper.

on investment), reduce social spending, or both. Although the paper shows that this did not happen in Chile, one needs to be aware that during this period the country was under a dictatorship. Assuming that the same degree of fiscal austerity can result in a democratic environment is not guaranteed.

Figure 1. Comparing cyclical patterns of investment in Chilean recessions

A. Investment level around cyclical trough (trough=100)



B. Investment pattern around cyclical trough (peak-trough distance=100)

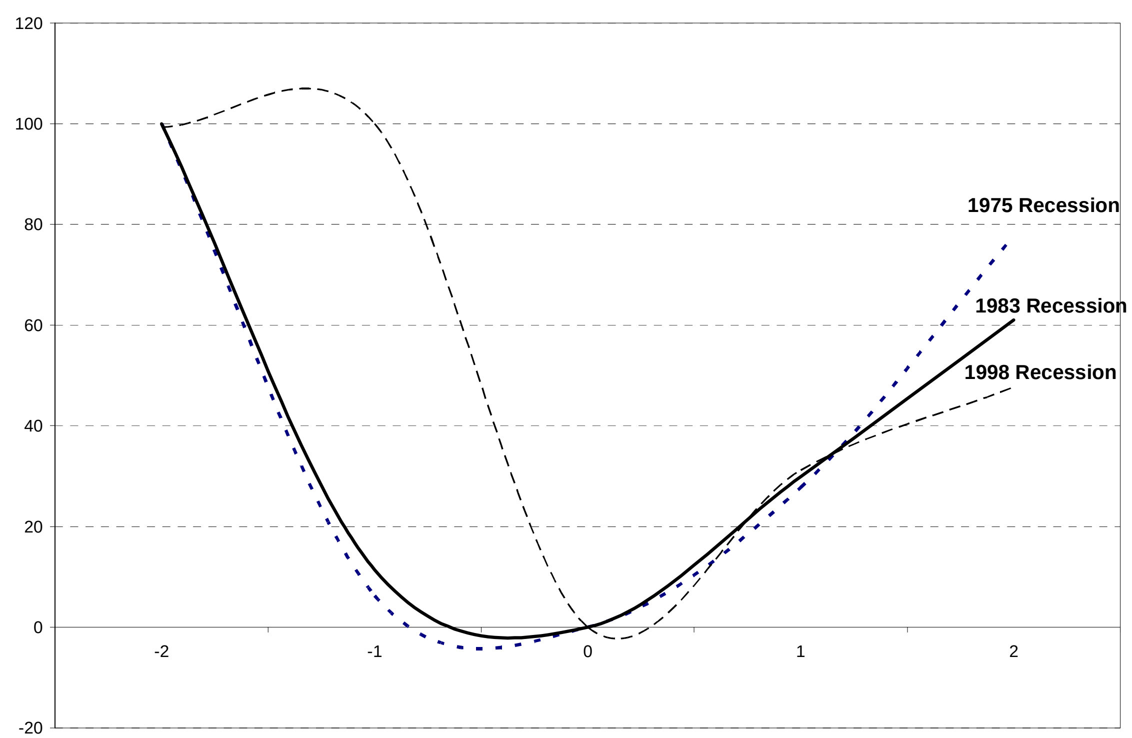
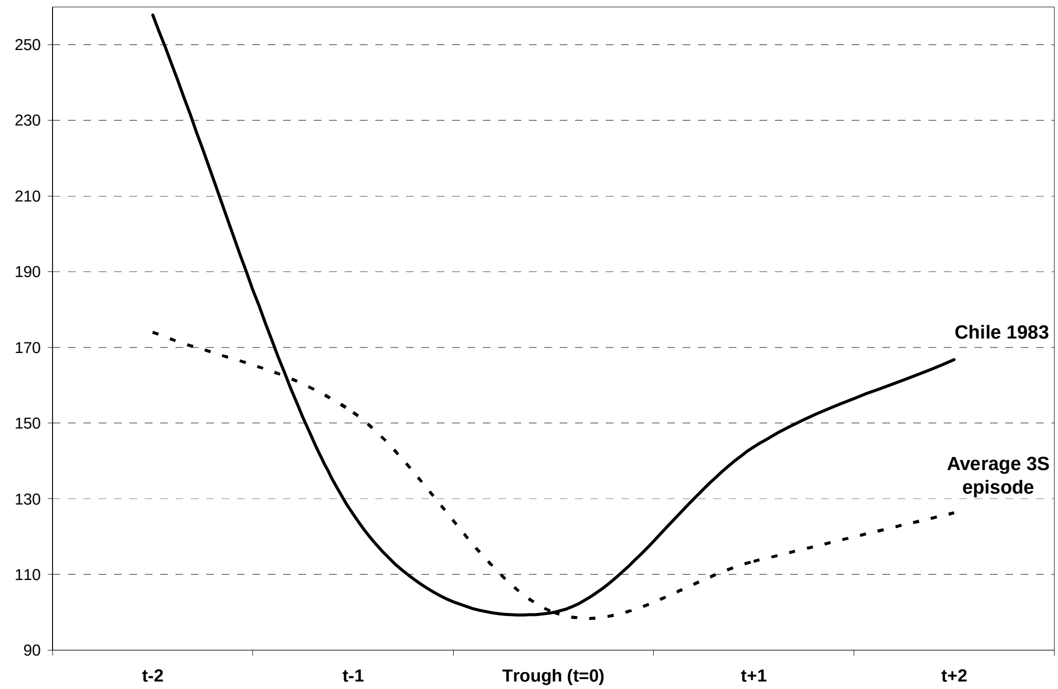


Figure 2. Comparing cyclical patterns of investment, Chile 1983 and typical systemic sudden stop episode.

A. Investment level around cyclical trough (trough=100)



B. Investment pattern around cyclical trough (peak-trough distance=100)