The Impact of institutional investors on equity markets and their liquidity

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Chapter 7

The impact of domestic mutual funds on the Slovenian equity market

7.1 Introduction

This chapter presents one of the first attempts to analyze the impact of institutional investors on the Slovenian equity market. The chapter is motivated by recent empirical studies on the impact of institutional investors on the equity market’s liquidity, and by the theoretical literature on the consequences of institutional ownership for the corporate governance of firms. We focus on the impact of closed-end funds (PIDs) on the organized equity market of the Ljubljana Stock Exchange (LJSE) in the period 1996-1999.1

PIDs (the Slovenian abbreviation for authorized investment companies) are the Slovenian version of closed-end mutual funds. They were created as part of the process of the abolition of social ownership ('privatization').2 Consequently, they have some specific ‘transitional’ features that are supposed to vanish gradually, until PIDs resemble some standard type of financial institutions. Their most important transitional feature are ownership certificates (vouchers), for which PIDs were initially ‘selling’ their shares. Subsequently, PIDs

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1 Note that Slovenia had no PIDs in place before 1994. In many respects, 1994 was a turning point for the Slovenian capital market. In that year, the Securities Market Agency was established as the official supervisor of the Slovenian securities market, and the Law on Investment Funds and Management Companies was passed.

2 Slovenian ‘mass privatization’ can hardly be described as privatization in its usual sense, mostly because of the existence of social, not state ownership in the period before 1992. Social ownership was a non-ownership concept, which attempted to replace market mechanisms with societal agreements and self-management contracts (Bohinc and Bainbridge (2000)). Firms were run by directors (executive managers) and controlled by the workers’ councils. The use of a more appropriate term ‘abolition of social ownership’ was therefore suggested by Ribnikar (1998).
Chapter 7. Mutual funds and the Slovenian equity market

exchanged these certificates for the shares of privatizing companies. PIDs are a frequent subject of policy debates in Slovenia, with the latest one focusing on their optimal future organizational form.³

We focus on PIDs because the open-end funds are too small to have any impact on the equity market. Their net asset value represents less than 2% of the total asset value of PIDs. The impact of other non-bank financial institutions, like insurance companies and pension funds, is hard to evaluate. Private pension funds do not exist yet, and the status of the majority-state-owned insurance companies has not been resolved. We have to exclude foreign mutual funds from our analysis due to the lack of data.⁴

In the course of this chapter we will try to find answers to the following questions: How important are mutual funds within the Slovenian financial sector? What can the portfolio structure of funds and the ownership structure of Slovenian companies tell us about the potential impact of mutual funds on the equity market? How important are PID shares for the LJSE? What is the impact of ownership concentration on the liquidity of LJSE-traded shares?

We show that PIDs own an increasing number of Slovenian companies. We find some evidence that might suggest that the trading volume of shares of listed PIDs has positively influenced the trading volume of non-PID shares on the LJSE, and its volatility. Our main result suggests that the cumulative blockholdings of large investors and the shareholdings of PIDs have a negative impact on the liquidity of listed shares in 1997-1999.


³According to the Law on Investment Funds and Management Corporations of 1994 (Official Gazette of the Republic of Slovenia, 6/94), the authorized investment companies have to transform themselves into regular investment companies within 5 years. In an amendment of March 1999 to this Law, this period was extended to March 13, 2000 if PIDs wanted to transform into holding companies. For transformation into regular corporations, or regular open- or closed-end mutual funds the new deadline is July 13, 2002. Lukovac (1999) provides an overview of the issues regarding the future legal form of PIDs and their transformation.

⁴According to the Bank of Slovenia (Financial Markets, November 1999), foreign investors accounted for 14.5% of total equity trading volume on the Ljubljana Stock Exchange in 1996. Their share increased to 27.5% in 1997 and dropped to 10% in 1998. In 1999, the trading volume of foreign investors represented only 1.4% of the total trading volume of all shares. In the months with the strongest presence of foreign investors (in 1997), their contribution to the total trading volume was as high as 48%. About two-thirds of all foreign trading on the LJSE is done by institutional investors, followed by corporations and individuals. Foreigners have so far traded almost exclusively the shares of a few Slovenian blue-chip companies (like the pharmaceutical companies Krka and Lek).
be positively correlated with market liquidity, even though they decrease the free float of shares. Namely, blocks of shares in the hands of one (or more) large shareholder(s) cannot be built without sufficient liquidity in the market. Becht (1999), however, finds a significant negative relationship between market liquidity of a sample of German and Belgium shares, and the cumulative blockholdings of large shareholders in these same companies. Similarly, we find evidence that PIDs, which can be considered large shareholders in Slovenia also have a negative impact on the liquidity of the Slovenian equity market.

PIDs have been studied in the Slovenian academic literature before, but the focus of those studies was different to ours. Ribnikar (1998) emphasizes their (primarily) negative impact on the savings rate within the Slovenian economy and suggests ways in which their role in the process of the abolition of social ownership can be neutralized by facilitating the reform of the pension system. Žnidarsić-Kranjc (1998) evaluates the performance of PIDs in the first five years of their operations, and provides economic and political reasons for their unfavorable results. By providing empirical evidence on the effects of PIDs (and open-end funds) on the Slovenian equity market we add another dimension to the existing literature on mutual funds in Slovenia.

The chapter is organized as follows. In the next section we briefly describe the equity market of the LJSE. In Section 3 we illustrate the size, relative importance, and the portfolio structure of mutual funds, with the focus on PIDs. Section 4 brings an analysis of the ownership structure of Slovenian corporations. The quantitative analysis of the impact of PIDs on the equity market and its liquidity is set out in Section 5. Section 6 concludes.

7.2 The Slovenian equity market

Slovenian financial markets started to develop simultaneously with the reforms of the economic system in 1988-89. Slovenia needed a well-organized, transparent and liquid capital market which would operate with low costs, stimulate the development of financial services sector and direct the increasing flows of capital into productive investments (Mramor (1996)). Such a market was also needed to facilitate some of the phases in the process of the ownership restructuring of the Slovenian corporate sector, although it was not a precondition for its start-up.

The process of ‘privatization’ of social ownership had a strong impact on the organization of the LJSE. It also brought along a lot of new securities and new capital market participants (PIDs, for example). The shares of ‘privatized’ companies and shares of PIDs attracted a lot of interest and they represent a significant part of the trading volume of LJSE-listed shares.

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<tbody>
<tr>
<td>Market capitalization (USD million)</td>
<td>337.9</td>
<td>476.8</td>
<td>597.7</td>
<td>799.3</td>
<td>1252.4</td>
<td>2360.5</td>
<td>4406.0</td>
<td>4673.9</td>
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<tr>
<td>Trading volume (USD million)</td>
<td>167.1</td>
<td>770.3</td>
<td>875.9</td>
<td>743.3</td>
<td>642.7</td>
<td>678.2</td>
<td>1043.6</td>
<td>1461.3</td>
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<tr>
<td>Market turnover ratio</td>
<td>0.5</td>
<td>1.6</td>
<td>1.5</td>
<td>0.9</td>
<td>0.5</td>
<td>0.3</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Number of securities traded</td>
<td>25</td>
<td>33</td>
<td>31</td>
<td>49</td>
<td>82</td>
<td>129</td>
<td>173</td>
<td>237</td>
</tr>
</tbody>
</table>

Source: Ljubljana Stock Exchange and the Bank of Slovenia.

In Table 7.1 we show the total market capitalization, total trading volume and total number of securities traded on the LJSE, including shares, corporate and government bonds and the short-term securities of the central bank (Bank of Slovenia). While the total market capitalization and the number of traded securities increased monotonically in the period 1992-1999, the trading volume did not. The drop in the total trading volume in 1996 was more than recovered by 1998 when total trading volume and market capitalization of exchange increased due to the introduction of privatization shares and the shares of PIDs. The increase in market capitalization was not accompanied by any corresponding increase in the trading volume of privatization and PID shares. This shows in the decreasing total market turnover (trading volume divided by market capitalization), which implies that the stock exchange as a whole has become increasingly illiquid. A slight recovery of market turnover is observed in 1999, however. A similar trend is observed for the equity market alone (see Figure 7.2).

The number of shares traded on all three market segments of the LJSE, i.e. Market A, Market B and the Free market, in Table 7.2 shows that privatization shares have contributed to the recent increase in the size of the stock exchange. In addition to the LJSE, shares can also be traded on the unorganized, or off-exchange market. There, PIDs and three state privatization-related funds trade shares for other shares, ownership certificates, cash or for real estate. Shares from internal purchases and internal equity distribution, cash or for real estate. Shares from internal purchases and internal equity distribution,
Table 7.2: The number of shares traded in different segments of the LJSE, 1992-1999.

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<tbody>
<tr>
<td>A and B Market</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>18</td>
<td>25</td>
<td>30</td>
<td>29</td>
<td>30</td>
</tr>
<tr>
<td>Free Market</td>
<td>6</td>
<td>16</td>
<td>17</td>
<td>9</td>
<td>27</td>
<td>55</td>
<td>93</td>
<td>150</td>
</tr>
<tr>
<td>- of which mutual funds (PIDs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(30)</td>
<td>(46)</td>
</tr>
<tr>
<td>All shares</td>
<td>8</td>
<td>16</td>
<td>19</td>
<td>27</td>
<td>52</td>
<td>85</td>
<td>122</td>
<td>180</td>
</tr>
<tr>
<td>- of which non-PID privatization shares</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(29)</td>
<td>(61)</td>
<td>(73)</td>
</tr>
</tbody>
</table>

Source: Ljubljana Stock Exchange.

and partly transferable shares are also traded in this market.

In Figure 7.1 we plot the share of the equity market in the total trading volume and market capitalization of the exchange. The graph suggests the increasing relative importance of the equity market within the LJSE in the last decade. In 1992, the stock exchange could more appropriately be characterized as a marketplace for bonds, as the trading volume of shares accounted for less than 5% of the total turnover of the exchange. The share of shares in the total market capitalization was similarly low. From 1996 on, the market for shares has strictly dominated other segments of the LJSE in terms of trading volume and market capitalization.\(^8\)

Although the market capitalization of shares grew rapidly during the period 1992-1999, it remained small relative to GDP. It accounted for less than 2% of GDP in 1993-1995, but increased substantially in years 1996-1997, when it was 4.9% and 10.9%, respectively. At the end of 1998, the equity market’s capitalization already accounted for 17.4% of GDP.\(^9\)

The size indicators do not give a complete description of the equity market. Informa-

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\(^8\)Most of the trading with shares still takes place on the exchange. However, the off-exchange trading volume of all securities accounted for almost 50% of the total LJSE trading volume in the first three quarters of 1999 (Financial Markets, November 1999). The structure of off-exchange trades is relatively different. The proportion of trades with shares is much smaller, and the proportion of trades with bonds much larger than in case of transactions that take place on the exchange.

\(^9\)These percentages are comparable to some other transition economies, and some OECD countries like Italy, Austria or Greece. For example, in 1996 the stock market capitalization as a percentage of GDP was 12% in Hungary, 7% in Poland, 26% in Estonia and 39% in the Czech Republic (Financial Market Trends 70, 1998).
Figure 7.1: The relative importance of the market for shares within the LJSE in 1992-1999, measured as the percentage contribution to the total trading volume and market capitalization of the LJSE. The totals include bonds, T-bills etc.

tional efficiency is one additional market property that should be considered. Some recent empirical research suggests that the LJSE equity market is not even weak-form efficient: there is significant autocorrelation in daily share prices and returns, market returns do not behave like a random process etc.\textsuperscript{10} Low market liquidity might explain some of these properties. It might also explain why, despite its growth, the organized equity market remains a relatively unimportant source of capital for Slovenian corporations.\textsuperscript{11} Empirical evidence shows that the most important sources are internal funds and bank loans.\textsuperscript{12} An illiquid equity market could make equity too expensive for the firms. If market liquidity is low, investors require higher liquidity premiums and the cost of capital for firms is higher. Furthermore, low E/D (earnings per share/dividends) ratios, low dividends, non-active shareholders in the listed firms make the equity market less attractive for investors as well.

\textsuperscript{10}See Dezelan (1999).
\textsuperscript{11}Veselinović (1998) discusses the ten most important reasons why firms look for capital outside the stock exchange. He mentions securities market regulation, the lack of demand for long-term capital, the negative effects of the supply of shares of the privatizing companies, and others. The cost of issuing and floating shares might be another reason why companies search for capital outside the exchange.
\textsuperscript{12}See Krizaj (1999) for a discussion of the importance of bank loans as a source of capital for Slovenian firms.
A very crude measure of the liquidity of Slovenian listed shares is the ratio of monthly trading volume of all shares (i.e. shares listed on the A, B and OTC markets) over their end-of-month market capitalization. A low value of the ratio means that the market liquidity of shares is low. The plot of the ratio for the LJSE equity market in Figure 7.2 suggests a deteriorating monthly market liquidity over time. The ratio of monthly trading volume to end-of-month market capitalization was increasing until January 1996, and then dropped significantly. It remained at a low level afterwards, suggesting relatively low liquidity. For comparison, the corresponding ratio for Hungarian listed shares was between 50% and 240% during the same period.

The descriptive statistics could lead us to conclude that the privatization shares on average added to the size of the equity market, but not to its liquidity. The introduction of privatization shares substantially increased the equity market's capitalization, but it did...
not contribute much to the total trading volume of the equity market. According to Figure 7.2, PID shares may have had a similar effect.

### 7.2.1 PID shares on the LJSE

In January 1998, shares of the first PIDs became quoted on the free market of the LJSE. We provide a short institutional background of PIDs in Appendix A. Figure 7.3 shows how the number of listed PIDs and the market capitalization of PID shares evolved in time. By the end of 1999, the number of PIDs with shares quoted on the exchange increased to 48. The total market capitalization of PID shares increased accordingly.\(^\text{15}\)

![Figure 7.3: Market capitalization and trading volume of PID shares, and the number of listed PIDs on the LJSE, 1998-1999.](image)

The introduction of PID shares to the exchange changed the structure of trading volume of the LJSE. The trade in shares of PIDs added a lot to the overall trading volume of the

\(^{15}\)The large drop in the market capitalization of PID shares in August 1999 was due to the temporary termination of trading with PID shares. In accordance with the new Law on the First Pension Fund of the Republic of Slovenia and the transformation of the authorized investment companies (Official Gazette of the Republic of Slovenia, 50/99), shares of PIDs had to be re-denominated and registered with the clearing house anew. Until this process was completed, PID shares were not traded.
LJSE in 1998-1999. The contribution of PID shares to the total trading volume of all shares was increasing fast. From zero percent in January 1998, it grew to 20% in November 1998 and reached 45% in August 1999. Due to the increasing importance of PID shares on the exchange, the LJSE started publishing a separate price index for PID shares, the PXI, in February 1999. The relatively high proportion of transactions with PID shares is primarily due to the specific circumstances within the Slovenian financial system. A more active primary equity market could easily divert investors' interest elsewhere.

In Section 5 we discuss other dimensions of the impact of PIDs on the equity market. Next, we discuss the size of the mutual fund industry and the portfolio structure of PIDs.

7.3 The Slovenian mutual fund industry

The history of Slovenian mutual funds is less than ten years in length. The mutual fund industry is dominated by the closed-end type of funds, or PIDs. Because PIDs today account for almost 99% of the total mutual fund assets, we focus on the impact of PIDs on the Slovenian equity market.17 We provide a short analysis of open-end funds and their potential impact on the equity market in Appendix B. In this section, we first illustrate the relative size of the mutual fund industry, and PIDs, within the Slovenian financial sector. We then analyze the composition of PIDs' assets to see how large their investment in shares is.

7.3.1 Size of mutual funds

According to the latest statistics available, total assets of open- and closed-end funds account for about 17% of assets of the whole financial sector.18 The figures in Table 7.3 show that banks, together with savings and loans institutions, dominate the Slovenian financial system in terms of asset value. They hold more than two-thirds of all financial sector assets, and their share increased in 1998. Mutual funds are the largest of the non-bank financial institutions, followed by insurance companies and securities brokers. However, the share of mutual funds dropped by more than one percentage point in 1998. Total assets of open-end funds accounted for only 0.1% of the total financial sector asset value at the end of 1998, which indicates that PIDs clearly dominate the mutual fund industry. Note that, excluding ownership certificates, the assets of mutual funds together

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16 In July 1999, for example, transactions with PID shares represented 64% of transactions with all LJSE-quoted securities (Financial Markets, August 1999).
17 Excluding PIDs, there were no other closed-end funds in Slovenia in December 2000.
18 At the time of writing this, the statistics for 1999 are not yet available, so the last ones apply to 1998.
Table 7.3: Participation of different financial institutions in the total assets of the financial sector, 1997-1998.

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<thead>
<tr>
<th></th>
<th>1997</th>
<th>1998</th>
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<tbody>
<tr>
<td>Banks and S&amp;Ls</td>
<td>69.3%</td>
<td>70.3%</td>
</tr>
<tr>
<td>PIDs</td>
<td>17.9%</td>
<td>17.6%</td>
</tr>
<tr>
<td>Open-end mutual funds</td>
<td>0.1%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Insurance companies</td>
<td>6.5%</td>
<td>7.2%</td>
</tr>
<tr>
<td>Leasing companies</td>
<td>2.8%</td>
<td>3.2%</td>
</tr>
<tr>
<td>Securities brokers</td>
<td>1.0%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Other financial institutions</td>
<td>2.6%</td>
<td>2.1%</td>
</tr>
</tbody>
</table>


only account for 9% of assets of the whole financial sector. In the absence of private pension funds, mutual funds remain the most important non-bank financial intermediary.\(^\text{19}\)

Mutual fund assets represent an ever increasing percentage of GDP each year (see Table 7.4). The total asset value of mutual funds grew to over 20% of GDP in the last year examined. This percentage is comparable with Switzerland, for example, and considerably more than some other OECD countries like Poland, Hungary, Turkey or Mexico.\(^\text{20}\) PIDs account for most of this growth.

In Table 7.4 we provide some data on the size of PIDs and open-end funds. To give an indication of the relative importance of PIDs, we also include the percentage of PID assets in the total financial sector assets in the table. We see that the number of PIDs is much larger than the number of open-end funds. The sharp decrease in the number of PIDs between 1997 and 1998 was mainly due to restructuring. The larger authorized management corporations merged the assets of funds under their management. The only decrease in the number of open-end funds was due to the first large capital market manipulation involving mutual funds which took place in 1996. Four funds took part in the illegal dealings of shares, all managed by the same company. The licence of the management company for dealing with securities was revoked, and most of the assets of the funds involved were transformed into claims on the holding company to which the management company in question belonged.\(^\text{21}\) This resulted in a large drop in the total value of open-end fund

\(^{19}\)The balance-sheet-based statistics may not be the best indicator of the degree of financial intermediation of different financial institutions. As in the case of brokers, the size of their intermediation does not show directly in their balance sheet. Although they are much smaller than PIDs in terms of assets, the value of investments intermediated by brokers and PIDs was almost the same at the end of June 1999 (Financial Markets, November 1999).

\(^{20}\)The value of ownership certificates is included in the assets of the funds in this calculation. The data for the OECD countries is provided in Financial Market Trends 72 (February 1999).

\(^{21}\)The rest of the assets were put under the management of another company as two new funds.
7.3. The Slovenian mutual fund industry

Table 7.4: Some descriptive statistics on PIDs and open-end funds, 1994-1999.

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<tbody>
<tr>
<td>Number of PIDs</td>
<td>44</td>
<td>48</td>
<td>64</td>
<td>60</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>Total asset value of PIDs (in SIT billion)</td>
<td>273*</td>
<td>389</td>
<td>455</td>
<td>526</td>
<td>593</td>
<td>599</td>
</tr>
<tr>
<td>% of certificates among assets of PIDs</td>
<td>100%</td>
<td>84%</td>
<td>66%</td>
<td>57%</td>
<td>52%</td>
<td>49%</td>
</tr>
</tbody>
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<table>
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<tr>
<th>Open-end funds</th>
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<tbody>
<tr>
<td>Number of open-end funds</td>
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<tr>
<td>Total value of open-end fund assets (in SIT billion)</td>
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<tr>
<th>Mutual funds together</th>
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<tr>
<td>Total mutual fund assets as a % of GDP</td>
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*Only total equity value of PIDs available for 1994.

b: The estimate is based on the assumption that GDP in the last quarter of 1999 grew at the same rate as in the third quarter.

Source: Bank of Slovenia and Securities Market Agency.

assets, relative to their 1995 value. Overall, it is believed that a lot of trading volume of shares in 1996 took place for the purpose of price manipulations. In this way, it affected the overall equity market.

Clearly, PIDs are the dominating type of mutual funds in terms of number and asset value.22 At the same time, almost half of the total assets of PIDs still comprises ownership certificates. If PIDs exercise their legal option to become open-ended, and exchange the remaining ownership certificates for shares in the near future they could operate more like conventional mutual funds.23 As passive shareholders and active portfolio managers, ‘open-ended PIDs’ could have a larger impact on the organized equity market. Note that the LJSE-traded shares already represent the largest part of portfolios of existing open-end funds. This is not the case with PIDs yet, as we will see in what follows.

7.3.2 Portfolio composition of PIDs

The portfolio structure of mutual funds is partly regulated. The restrictions on the relative size of different asset categories are determined by the Law on Investment Funds and Management Companies of 1994. According to this Law, PIDs can invest at most 10%...
of their assets in securities of the same issuer and its related companies. In addition, a PID can own at most 20% of the shares in an individual company that is in business relationship with legal bodies that own more than 10% of the shares of the authorized management corporation that manages it. PIDs can also invest up to 10% of their assets in foreign securities, if they are traded on one of the exchanges that the Securities Market Agency (Agency) approves.

In Figure 7.4 we present the composition of PID portfolios graphically. For clarity, only the most important asset categories are distinguished. Shares are the largest asset category of PIDs, if we exclude ownership certificates. The percentage of ownership certificates among PID assets decreased from 84% to 49% in five years. This drop comes primarily at the expense of the increasing proportion of shares in PIDs’ portfolios. Excluding ownership certificates, shares represented 92% of PIDs’ assets at the end of 1999. About 2% of the total assets was in short-term securities, and the rest in bonds, bank deposits and other assets. The data on the portfolio structure of individual PIDs, kindly provided by the Agency enables us to study the composition of PIDs’ assets in more detail.

![Figure 7.4: The end-of-year composition of PID assets in the period 1995-1999.](image)

24The Law on Investment Funds (1994) distinguishes among PIDs and the regular closed-end funds. PIDs are supposed to be a temporary institution that will transform themselves into either a holding company or a regular closed-end fund. For the ‘regular’ closed-end mutual funds the maximum investment in individual company is higher, 15%. However, PIDs are currently (i.e. at the end of 2000) the only ‘closed-end’ funds in place.
Our dataset covers 12 quarters, starting with the third quarter of 1996 and ending with the second quarter of 1999. For each quarter, the Agency provided a detailed structure of assets of a total of 97 mutual funds. We include only those funds for which we have at least six quarters of data available. Using this criterion, we have to drop 24 investment funds that were either established after March 1998 (10 funds), or which stopped their operations by September 1997 (14 funds). This leaves us with 73 funds, of which 15 are open-ended, and with 757 fund-quarters of data.

The summary (panel data) statistics show that the total asset value of the average PID in our sample is SIT 8.43 billion. Without ownership certificates, the average size drops to SIT 3.55 billion. The average PID has 40.2% of its assets invested in shares (excluding ownership certificates, this percentage increases to 92.3%). In addition, the average PID has only 1% of assets invested in bonds, 0.7% in cash and deposits, and 0.1% in short-term securities. Other less important asset categories make up the rest.

The mean percentage of PID assets in shares has been increasing since 1996. In the last six quarters of the sample, this proportion is significantly higher than in the preceding quarters, if we include ownership certificates. We also observe that larger PIDs on average invest a higher percentage of their assets in shares than do smaller PIDs. Furthermore, the average PID has only 25% of non-certificate assets in shares that were purchased on the exchange. 67% of its assets are in shares that were bought off-exchange. The high percentage of non-exchange listed shares among the assets of the average PID is not surprising. The shares that PIDs initially acquired either from the Development Fund, other PIDs, or the two privatization-related state funds were not listed on the exchange. Some of these shares became listed later on, but not all. If PIDs decide to open, i.e. to transform themselves into open-end funds, it would be reasonable to expect that the relative share of listed shares in their assets will come closer to that of the open-end funds today.

Because it is only a matter of time when PIDs will exchange all their certificates for shares, we can expect that the proportion of shares among PID assets will increase even further. As almost pure equity funds they might have an influence on the liquidity of shares in their portfolios. Their influence of PIDs depends primarily on the number of shares they hold in each company. For this reason, we look at the ownership structure of Slovenian firms in the next section.

\[25^{\text{See also Financial Markets (November 1999).}}\]
7.4 Ownership structure of Slovenian firms

The composition of shareholders and the size of their ownership stakes can play an important role in determining the liquidity of the markets for corporate shares. For this reason, we look at the ownership structure of Slovenian corporations in more detail. First, we look at who the owners are. Then, we look at the ownership dispersion of the exchange-listed firms and the non-listed firms. We conclude the section with a discussion of how important PIDs are as owners of listed and non-listed companies.

Figure 7.5 illustrates the composition of shareholders of all the companies that were registered with the Clearing and Depository House (KDD) in 1998-1999. On the vertical axis are the various groups of investors that hold equity. The percentages on the horizontal axis represent the proportions of the total market value of equity of registered companies held by a particular group of shareholders. The KDD keeps records of the securities owners of all dematerialized securities. Its central registry includes securities traded on the organized securities market, freely transferable securities not traded on the organized market and securities that have not been publicly offered. Only some of the registered companies have their shares listed on the exchange.

According to the aggregate ownership structure in Figure 7.5, state and households are the two largest groups of shareholders of Slovenian corporations. Non-financial corporations and other financial intermediaries (including PIDs) follow with significantly smaller, and slowly decreasing ownership stakes. The shareholdings of non-bank financial intermediaries decreased from 17% to 11% in fifteen months. Insurance companies cannot be considered large shareholders before the fall of 1998. Subsequently, a few ‘recapitalization’ equity issues that were mostly bought within the insurance industry increased the overall stake of insurance companies. Furthermore, the state is increasing its ownership in the corporate sector, while the relative share of foreign investors is steadily decreasing.

Prasnikar et al. (1999) provide another perspective on the ownership structure of Slovenian companies. They study a sample of 130 large and middle-sized representative firms in the period 1996-1998. Households (individuals, managers, other past and current employees and their families) and the state (Restitution Fund and the Capital Fund) are the largest

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26 When the market value of a share is not available, the KDD uses its book value.
27 Note that state is primarily represented by the Slovenian Development Corporation, the Restitution Fund and the Capital Fund of the state Pension and Health Insurance Fund. According to the Slovenian ‘mass privatization’ program, the two state funds should on average own about 20% of equity of all ‘privatized’ companies.
28 Other financial intermediaries include mutual funds (PIDs and open-end funds), investment management companies, leasing and factoring companies and others. The stock exchange, the commodities exchange, clearing house (KDD), brokerage houses and (currency) exchanges are the largest auxiliary financial services.
29 Large companies are defined as companies with more than 500 employees. Middle-sized firms have between 300 and 500 employees.
7.4 Ownership structure of Slovenian firms


shareholders in the firms in their sample. In comparison with the KDD’s data, households and PIDs hold larger equity stakes. Furthermore, the shareholdings of PIDs in the sample companies are increasing over time.

The aggregate structure of equity ownership helps us identify the largest owners and reflects the dynamics of ownership structure. It does not say anything about the concentration of ownership. To find out more about ownership concentration we now inspect the ownership structure of individual companies. We separate those firms whose shares are listed on the LJSE from those with non-listed shares. We end this section with a discussion of PID ownership.

7.4.1 Ownership dispersion of the LJSE-listed firms

It is important to see how dispersed shares are over different shareholders, because a higher ownership concentration may imply less trading in a particular share, which might lead to lower market liquidity. We explore the ownership concentration of Slovenian firms using the data on cumulative shareholdings of investors which hold more than 5% of shares in
Table 7.5: Summary statistics on the ownership dispersion of firms listed on the LJSE, 1996-1999 (end of the years). Blockholdings are the sum of ownership stakes that exceed 5 percent.

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean blockholdings</td>
<td>37.1%</td>
<td>43.3%</td>
<td>40.1%</td>
<td>45.7%</td>
</tr>
<tr>
<td>Median blockholdings</td>
<td>37.1%</td>
<td>41.5%</td>
<td>40.6%</td>
<td>45.5%</td>
</tr>
<tr>
<td>Number of firms</td>
<td>33</td>
<td>63</td>
<td>97</td>
<td>159</td>
</tr>
</tbody>
</table>

Source: KDD and own calculations.

The mean sum of shareholdings larger than 5%, together with the median of this sum, serve as the proxies for the concentration of ownership. Both statistics dropped slightly in 1998, but increased substantially in 1999. The 1998 decrease is probably due to the introduction of PID shares on the LJSE. PIDs have a large shareholder base and their shares are widely held.

Our simple statistics suggest that the ownership concentration of listed companies is increasing. Large shareholders on average owned more than 45% of shares of the listed companies at the end of 1999. The numbers for some other continental European countries are similar. In Germany, for example, the mean of cumulative blockholdings was 42.2% in 1998. The ownership concentration of Belgian listed firms seems to be much higher. There, large shareholders together held 60.5% of shares of listed companies in 1996. Becht (1999) shows that such ownership structure negatively affects the liquidity of the Belgian and German equity markets.

7.4.2 Ownership dispersion of unlisted firms

The summary statistics on ownership concentration in Table 7.6 show that, compared with listed firms (see Table 7.5), the ownership concentration of unlisted firms is higher.

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30 The Belgian and German data refer to the Brussels Stock Exchange and the Frankfurt Stock Exchange, respectively. They are borrowed from Becht (1999).
7.4. Ownership structure of Slovenian firms

Table 7.6: Summary statistics on the ownership dispersion of KDD-registered firms, not listed on the LJSE, at the end of each year in 1996-1999. Instead of the number of firms, we report the number of stocks in the registry here. The two differ due to multiple issues of stocks by the same company.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean blockholdings</td>
<td>53.7%</td>
<td>55.2%</td>
<td>62.0%</td>
<td>66.9%</td>
</tr>
<tr>
<td>Median blockholdings</td>
<td>51.8%</td>
<td>52.5%</td>
<td>58.3%</td>
<td>64.7%</td>
</tr>
<tr>
<td>Number of shares in the KDD registry</td>
<td>173</td>
<td>284</td>
<td>367</td>
<td>576</td>
</tr>
</tbody>
</table>

Source: KDD and own calculations.

Table 7.7: Summary statistics on the ownership of PIDs in the firms registered with the KDD at the end of each year in 1996-1999.

<table>
<thead>
<tr>
<th></th>
<th>LJSE-listed firms</th>
<th>Unlisted firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean shareholding of PIDs</td>
<td>Median shareholding of PIDs</td>
</tr>
<tr>
<td>Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>19.2%</td>
<td>21.6%</td>
</tr>
<tr>
<td></td>
<td>17.7%</td>
<td>21.1%</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>55</td>
</tr>
</tbody>
</table>

Source: KDD and own calculations.

(note that the unlisted companies represent the vast majority in the KDD registry). The ownership concentration of unlisted firms if also monotonically increasing. Almost 67% of shares in the average unlisted company were held by large shareholders at the end of 1999. Among the shareholders of Slovenian companies, PIDs are probably becoming a larger group each year. In the next subsection we check this premise.

7.4.3 Ownership stakes of PIDs

The increasing ownership concentration of Slovenian firms might be a result of the larger ownership stakes held by PIDs. Prašnikar et al. (1999) argue that, unlike the privatization-related state funds which are on average reducing their ownership stakes and diversifying their portfolios, PIDs are doing the opposite: their ownership stakes in 1996-1998 have increased. A closer inspection of the data on the ownership stakes of PIDs in the firms that are in the KDD registry concurs with the observations of Prašnikar et al. (1999).
Summary statistics on PID ownership in 1996-1999 are found in Table 7.7. We present the statistics for listed and unlisted firms in two separate panels. The numbers suggest that the number of listed and unlisted firms with PID ownership is increasing. Moreover, the average stake of PIDs in listed and unlisted firms is monotonically increasing over the studied period. However, the ownership stakes of PIDs in the unlisted firms grow faster. With the exception of 1996, the percentage of PID-owned shares is on average slightly higher for the unlisted firms. The increase in average PID ownership stakes might also come at the expense of foreign shareholders, whose ownership stakes in the listed firms are decreasing. At the end of 1999, they held 7.98% of total equity market capitalization. A year earlier, they owned 8.86%.

There are mixed opinions and little evidence on the role of PIDs in the companies they own. Their ownership stakes in many firms are large enough for PIDs to influence the management. The numbers in Table 7.8 confirm this. Table 7.8 illustrates the distribution of LJSE-traded companies according to the identity of the three largest shareholders with respect to the voting power. In short, the numbers indicate that PIDs hold the most votes in most companies. Bohinc and Bainbridge (2000) claim that PIDs intervene even in the day-to-day business decisions of the Management Boards. They actively participate in shareholder meetings, choose candidates for the Supervisory Board, control selection of members of the Management Board, and exert informal pressure on the Management Board.

In their prospectus for listing on the LJSE, most PIDs state that they will keep widely diversified portfolios and actively participate in the management if that might lead to the better performance of companies. Prašnikar and Gregorič (1999) argue that instead of striving for well-diversified portfolios, PIDs are attempting to be active shareholders. The question is whether they possess the required knowledge, experience and abilities. The two-tier governance structure of Slovenian corporations enables PIDs to exert their control and expropriate the control benefits, primarily through their representatives on the Supervisory Boards. In contrast, Žnidaršič-Kranjc (1998) emphasizes the positive role of PIDs and argues that PIDs have decided to become active shareholders and to improve the value of the companies that they own. There is no empirical evidence to confirm either of these arguments, only the anecdotal evidence on the negative effects of PIDs’ presence in the privatized firms. Whether or not PIDs act as prudent ‘corporate governors’ remains an interesting topic for future research. In this chapter we focus on the influence of PIDs on the equity market.

Ownership stakes of PIDs may not be identical to their effective voting rights due to the common stock in treasury, limited voting rights that the companies can determine in their statutes and proxies, for example. However, the differences between the two are not substantial in Slovenia.
7.5. PIDs and the equity market’s liquidity

Table 7.8: Distribution of the LJSE-traded firms according to the identity of shareholders with the most voting rights, end of July, 2000. Numbers in the table are percentages of the firms in which a particular group of shareholders holds the most (second-most and third-most) voting rights.

<table>
<thead>
<tr>
<th></th>
<th>1\textsuperscript{st} largest voter</th>
<th>2\textsuperscript{nd} largest voter</th>
<th>3\textsuperscript{rd} largest voter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals</td>
<td>8.1</td>
<td>11.0</td>
<td>9.6</td>
</tr>
<tr>
<td>Foreigners</td>
<td>5.1</td>
<td>2.2</td>
<td>0.0</td>
</tr>
<tr>
<td>State and municipalities</td>
<td>2.9</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>Other non-financial corporations</td>
<td>20.6</td>
<td>20.6</td>
<td>19.1</td>
</tr>
<tr>
<td>Banks and insurance companies</td>
<td>2.9</td>
<td>2.9</td>
<td>6.6</td>
</tr>
<tr>
<td>Capital fund of the RS</td>
<td>15.4</td>
<td>14.7</td>
<td>22.1</td>
</tr>
<tr>
<td>Restitution Fund</td>
<td>5.9</td>
<td>16.9</td>
<td>17.6</td>
</tr>
<tr>
<td>PIDs and mutual funds</td>
<td>37.5</td>
<td>23.5</td>
<td>16.9</td>
</tr>
<tr>
<td>Other financial institutions</td>
<td>0.0</td>
<td>2.9</td>
<td>4.4</td>
</tr>
<tr>
<td>Others</td>
<td>1.6</td>
<td>4.4</td>
<td>2.9</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Gregorić et al. (2000).

7.5 PIDs and the equity market’s liquidity

PIDs may affect the aggregate liquidity of the equity market, and the liquidity of individual shares. If we focus on trading volume as a measure of liquidity, we could say the following. First, trading by PIDs and the trade in shares of PIDs, if listed, get reflected in the aggregate trading volume and in share prices. Second, through individual transactions by PIDs, or on behalf of PIDs, market prices and trading volumes of individual shares are affected. In the second case, the size of the ownership stakes of PIDs might play an important role.

With respect to the aggregate market impact of PIDs, note that PIDs traded primarily outside the stock exchange. Initially, PIDs traded mostly through the auctions carried out by the Development Fund. Soon, they started to trade with each other, and with the other two privatization-related state funds.\textsuperscript{32} According to the Securities Market Agency’s annual reports, PIDs trade mostly among each other. This trading takes place entirely off the exchange, and there is no evidence to suggest that it has an impact on the liquidity of the LJSE’s equity market.

However, PIDs are also purchasing and selling shares in the equity market. In addition, shares of PIDs are also traded on the exchange, thereby affecting the overall trading volume.

\textsuperscript{32}For off-exchange trading with other parties, PIDs need additional permission from the Securities Market Agency.
and possibly market liquidity. The most direct way of analyzing the impact of PIDs on the
liquidity of individual shares would be to look at the transaction prices of shares purchased
or sold by PIDs on the LJSE. Unfortunately, such data is currently only available for
supervisory purposes. The difficulty lies in the fact that PIDs trade through multiple
brokers. Consequently, transactions initiated by PIDs appear under different codes that
are the proprietary information of the LJSE members.

Because we do not have transaction data we use the daily data on trading volume of shares
and the information on ownership stakes of PIDs and other large shareholders. We use
the data on trading volume of shares to test whether trade in PID shares contributes to
explanation of the trading volume of the rest of the equity market. Furthermore, we look
at whether the increasing importance of PID shares, as reflected in their contribution to
the total equity market capitalization, has any impact on the liquidity of the non-PID
shares. With the ownership data we analyze the impact of PIDs as large shareholders on
equity market liquidity.

7.5.1 The impact of PID shares on the trading volume of non-
PID shares

The introduction of PID shares to the LJSE increased the number of listed securities
and the aggregate trading volume. In addition, the presence of PID shares on the stock
exchange might also have spill-over effects on the rest of the market. At first sight, the
data suggests that this might be the case. If we run a regression of the trading volume
of non-PID shares on the trading volume of PID shares in the same period we find a
positive and significant relation. However, such a relation might be spurious. Changes in
the series might simply be driven by similar factors. What we need is an appropriate test
of the hypothesis that the trading intensity of PID shares increases the trading intensity
of non-PID shares.\textsuperscript{33}

In Figure 7.6 we plot the trading volume of non-PID shares, its mean and its standard
deviation. The mean and the standard deviation are calculated recursively, by enlarging
a window by one day, starting with January 3, 1996. Standard deviation and the mean
of the trading volume of non-PID shares increased with the listing of PID shares, which
started in January 1998, and continued until the end of 1999. Note that trading in PID
shares increased considerably by the end of 1998 (see also Figure 7.3), when the majority
of PID shares were already listed. The increase in the mean and the standard deviation
of non-PID shares coincides with the active trading in PID shares in the second part of
1998 and beginning of 1999.\textsuperscript{34} Since we cannot associate the changes in trading volume of

\textsuperscript{33}We can measure the trading intensity of shares either as trading volume in SIT billion, as a number
of transactions, or as a number of shares.

\textsuperscript{34}Figure 7.6 also illustrates how the (previously mentioned) price manipulations, which took place in
7.5. PIDs and the equity market's liquidity

non-PID shares with any other particular events of this period we could consider them to be a side-effect of active trading in PID shares. In order to test this hypothesis formally, we would have to make assumptions about the time series properties of the daily trading volume of non-PID shares. Due to numerous outliers and multiple periods of increased variance in the trading volume of non-PID shares, it is hard to find a model that would fit the data reasonably well, and allow us to perform appropriate statistical tests, like the Chow break-point test. Therefore, we will use some simple graphical and statistical tools to show that the trading volume of non-PID shares might have been accelerated by the trade in shares of PIDs.

First, we perform the Granger-causality test. We test the null hypothesis that the trading volume of PID shares (in SIT billion) does not Granger cause the trading volume of non-PID shares. Due to the non-stationarity of the series we perform the test on the first differences. For calculating the F-statistic we use daily data for the period January 1998–June 1999. Test results are summarized in Table 7.9. We can not reject the null hypothesis (for up to five lags of the change in the trading volume of PID shares) that the daily change in the trading volume of PID shares does not Granger cause the change in the trading volume of the rest of the shares traded on the LJSE in the studied period.

Second, we plot the actual daily trading volume of non-PID shares, the average daily trading volume calculated from the monthly trading volume ($\text{Dailyavg}(m)$), and the standard deviation of the latter ($\text{SDvol}(m)$) in Figure 7.7. The average daily trading volume and its standard deviation are also calculated recursively. The graphs of the three series are plotted in Figure 7.7, with the standard deviation plotted on the secondary (i.e. the right-hand side) axis. We can see that the average daily volume becomes smoother when calculated from monthly data. The effect of outliers is then reduced. The occurrence and persistence of shocks in the actual daily trading volume is visible in the graph of the standard deviation of the average daily trading volume. There are a few outliers, around which the trading volume of non-PID shares temporarily rises and then falls again. The standard deviation reached its highest levels in the period November 1998-March 1999, when the stock market in 1996 can hardly be described as ‘regular’, as we pointed out in Section 7.3.1). The estimate of the daily growth rate, $\lambda$, has positive and significant value. When we perform a Chow-breakpoint test, testing for a structural break in November 1998, we cannot reject the hypothesis of no structural break. We can also reject the null hypothesis of no structural break if we choose December 1998 or January 1999 as a potential breakpoint. If we re-estimate the model for the two sub-periods (i.e. for the periods before Nov 1, and after Nov 1, 1998), we see that the two estimates of $\lambda$ differ not only in size, but also in sign (the coefficients are $+0.001$ and $-0.004$, respectively), which is a clear indication that our simple model does not really fit the data.
level of trading volume of PID shares was increasing fast. It seems that trading in shares of PIDs also affected the volatility of the trading volume of non-PID shares in this period. The ‘shocks’ to the trading volume of non-PID shares become less frequent and of lower magnitude in the second half of 1999, when the ‘PID effect’ seems to have faded away.

Such graphical analysis can only provide indirect evidence of the impact of the trading volume of PID shares on the rest of the equity market. The shocks at the end of 1998 might have been induced by the trade in shares of PIDs. On the other hand, they may simply provide evidence that the trading volume of shares on the exchange is correlated. The time series of the trading volume of non-PID shares is so chaotic and determined by outliers that it is almost impossible to describe it with a model, without including additional explanatory variables. The analysis of other determinants of the trading volume of shares goes beyond this chapter.
Table 7.9: Results of the Granger causality test for the daily trading volume of PID shares and non-PID shares in the period January 1998 - June 1999. The null hypothesis is that the change in trading volume of PID shares does not 'Granger cause' the changes in trading volume of non-PID listed shares. The number of observations is 374, minus the number of lags.

<table>
<thead>
<tr>
<th>Number of lags</th>
<th>F Statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.006</td>
<td>0.936</td>
</tr>
<tr>
<td>2</td>
<td>0.607</td>
<td>0.545</td>
</tr>
<tr>
<td>3</td>
<td>0.767</td>
<td>0.512</td>
</tr>
<tr>
<td>4</td>
<td>0.937</td>
<td>0.443</td>
</tr>
<tr>
<td>5</td>
<td>0.555</td>
<td>0.734</td>
</tr>
</tbody>
</table>

Source: LJSE and own calculations.

7.5.2 PIDs and the equity market's turnover

The positive impact of the trading volume of PID shares on the trading volume of other shares can be due to the common factors, which cause the correlation in the trading volume of different shares. Because the trading volume of non-PID shares is not a very good measure of their liquidity in this case, we divide it by their market capitalizations to get what we call market turnover. Then we check whether the increasing presence of PID shares in the market, which shows in the increasing proportion of their market capitalization in the total equity market capitalization (of PID and non-PID shares), has any impact on market turnover, our new measure of market liquidity. The graphs of the percentage of PID shares in the total market capitalization ($%\text{Cap}(\text{PIDs})$) and the market turnover of non-PID shares are in Figure 7.8. Because data on market capitalization is only available on a monthly basis, while the trading volume is provided by the LJSE daily, we estimate daily market capitalization by simple interpolation. We assume that market capitalization increases by the same rate each day. We use this assumption to construct daily market capitalization for the overall equity market and for PID shares. Alternatively, we could simply scale trading volume by the average monthly capitalization. Both procedures are problematic, but since the changes in capitalization within the month are typically not very drastic the procedure used here should suffice for our purposes.

Although the trading volume of non-PID shares is now scaled by their estimated daily market capitalization, the series remains chaotic and has multiple outliers. We would like to know whether the share of PIDs in total equity market capitalization has any impact on the daily liquidity of the rest of the shares, measured as the turnover ratio of non-PID shares. We estimate the following regression equation using ordinary least squares:
Figure 7.7: Actual daily trading volume of non-PID shares, the average daily trading volume, \( \text{Dailyavg}(m) \), derived from the recursively calculated monthly trading volume, and the standard deviation of the average daily trading volume, \( \text{SDvol}(m) \), in the period January 1998 - September 1999 (all in SIT billion). The standard deviation is plotted on the secondary axis.

\[
T_{t,\text{nonPID}} = 0.001 + 0.155\Delta C_{t,PID} + 0.280T_{t-1,\text{nonPID}} + 0.08T_{t-2,\text{nonPID}} + u_t
\]

(13.230) (2.002) (5.868) (1.716) (7.1)

\( T_{t,\text{nonPID}} \) denotes the market turnover ratio of non-PID shares on day \( t \), and \( C_{t,PID} \) is the proportion of PID shares in the total equity market capitalization. There are 440 observations in the sample, and \( R^2 \) is 0.11. \( t \)-statistics are in the brackets below the equation. Because \( C_{t,PID} \) is not stationary, we use its first difference, \( \Delta C_{t,PID} \), as an explanatory variable. Regression results show that if the change in the contribution of PID shares to the total market capitalization relative to the previous day increased by 1 percentage point, the market turnover of non-PID shares would increase by 0.15 percentage points. The total (or long-term) effect of the same increase in total market capitalization on market turnover would be larger, i.e. 0.24 percentage points.\(^{36} \) The positive impact of PIDs on market turnover is statistically significant.

\(^{36}\)The latter follows from \( 0.15/(1 - 0.28 - 0.08) \).
7.5. PIDs and the equity market’s liquidity

Figure 7.8: Market capitalization of PID shares as a percentage of total equity market capitalization, and the market turnover of JSE-traded shares (excluding PIDs), January 1998-September 1999.

If we control for the possible trend in the turnover ratio of non-PID shares using a daily turnover ratio of PID shares, $T_{t,PID}$, as a control variable, the results change. The new regression equation is as follows:

$$T_{t,nonPID} = 0.001 + 0.140\Delta C_{t,PID} + (3.74E-14)T_{t,PID} + 0.305T_{t-1,nonPID} + u_t$$

(18.149) (0.988) (1.140) (3.168) (7.2)

We skip the second lag of the dependent variable in this case because it is not statistically significant and does not contribute much to the explanation of $T_{t,nonPID}$ (according to the Akaike and Schwarz information criteria). The most important change we observe is that the coefficient of the proportion of PID shares in the total equity market capitalization is no longer statistically significant. The size of the coefficient did not change much, however. Overall, there seems to be some (positive) temporal dependence between the change in the contribution of PID shares to the total market capitalization and the market turnover of the rest of the equity market, but it is not statistically significant.

37 There are 441 observations included in this regression. $R^2$ amounts to 0.11.
Table 7.10: Descriptive statistics on the ratio of annual trading volume to: i) the end-of-year market capitalization (ratio, upper panel); and ii) the free float of shares (ratio1, lower panel) of the LJSE-listed companies, 1996-1999. SD is standard deviation and N the number of observations.

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>33</td>
<td>63</td>
<td>97</td>
<td>159</td>
<td>352</td>
<td>319</td>
</tr>
<tr>
<td>mean_ratio</td>
<td>146%</td>
<td>19%</td>
<td>19%</td>
<td>31%</td>
<td>36%</td>
<td>25%</td>
</tr>
<tr>
<td>median_ratio</td>
<td>20%</td>
<td>16%</td>
<td>15%</td>
<td>21%</td>
<td>17%</td>
<td>17%</td>
</tr>
<tr>
<td>SD_ratio</td>
<td>547%</td>
<td>18%</td>
<td>19%</td>
<td>42%</td>
<td>172%</td>
<td>33%</td>
</tr>
<tr>
<td>mean_ratio1</td>
<td>275%</td>
<td>50%</td>
<td>90%</td>
<td>122%</td>
<td>115%</td>
<td>98%</td>
</tr>
<tr>
<td>median_ratio1</td>
<td>57%</td>
<td>33%</td>
<td>39%</td>
<td>57%</td>
<td>48%</td>
<td>47%</td>
</tr>
<tr>
<td>SD_ratio1</td>
<td>807%</td>
<td>52%</td>
<td>191%</td>
<td>183%</td>
<td>297%</td>
<td>170%</td>
</tr>
</tbody>
</table>

Source: KDD, LJSE and own calculations.

7.5.3 PIDs and the liquidity of individual shares

In Section 4 we have argued that the degree of ownership concentration in Slovenian firms is increasing. The concentration is the consequence of the increasing ownership stakes of PIDs and other large shareholders. At the same time, the liquidity of the equity market seems to be deteriorating in the last few years if we look at the monthly turnover ratios (see Section 2). Could the two phenomena be related?

In this section we empirically investigate whether or not the increasing ownership concentration of Slovenian corporations negatively affects market liquidity. We first present our data. The estimation results follow and the extensions of the estimated model conclude this section.

Data

The basic inputs for the regressions we perform in this section come from the KDD dataset (see Section 4). Market liquidity of individual shares is measured as the ratio of the annual trading volume to the end-of-year market capitalization. In Table 7.10 we show the means of this ‘turnover’ ratio (mean_ratio) for each year in the period 1996-1999. We see that our proxy for equity market liquidity dropped sharply in 1997, but started to show signs of recovery after 1998. The average ratio in 1999 was much lower than three years earlier.

To account for the fact that shares that are held in blocks by large shareholders may not be available for trade, we modify the turnover ratio in the following way. We use the logs of the ratio of trading volume and divide it by the free float of each share. A free float
of a share is the percentage of issued shares that is actually available for trade. In our case, it is calculated as the proportion of a share's market capitalization that is not held by large shareholders. Large shareholders are those shareholders that own at least 5% of a company's equity. Descriptive statistics on the modified turnover ratio are in the lower panel of Table 7.10. The modified ratio is on average much larger than the 'simple' ratio. Both ratios exhibit similar development over time.  

i) Basic regression

The purpose of this cross-section analysis is to see whether shareholdings by PIDs and other large stockholders reduce the liquidity of individual shares. We regress the modified turnover ratio (as a liquidity measure) on the sum of ownership blocks larger than 5% (B) and on the percentage of issued shares owned by PIDs (B_PID). In the estimation we only take into account non-PID shares. We run separate regressions for each year between 1996 and 1999. In the end, we pool the data for 1997, 1998 and 1999, and perform the same regression on the pool. In the pooled regression we also include dummy variables for 1997 and 1998, i.e. D_97 and D_98, respectively. In 1997, the Bank of Slovenia introduced restrictions on foreign portfolio investments, which made them fairly unattractive to foreign investors. The 1998 dummy is included to capture the effects of the introduction of PID shares to the LJSE. The estimation results for both types of models are in Table 7.11. Standard errors in all regressions in this section are (White) heteroscedasticity consistent.

The regression results deserve a few remarks. First, the values of R^2 and regression coefficients vary a lot over the years. Second, contrary to other years, the sign of the coefficient for the sum of blockholdings in the 1996 regression is positive. As such, it concurs with the argument of Bolton and von Thadden (1998) that blocks and liquidity can move in the same direction. Note that the coefficient is not statistically significant. Large trading volume might be a result of block-building. However, the 1996 results require a great deal of caution. First, the number of observations is small. Second, the results are very likely to be driven by the manipulations-based trading. It is believed that a large part of the 1996 trading volume was due to the illegal dealings and the consequences of revelation of the fact that price manipulations took place. For this reason, we exclude 1996 data from our pooled regressions.

Third, the regressions show that the cumulative shareholdings of large investors reduce the turnover ratio of individual shares. Shareholdings of PIDs also show a statistically

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38 This is not surprising as the correlation coefficient between the two ratios is +0.96.
39 Due to the construction of variables in our dataset, we are unable to separate the blockholdings of PIDs (i.e. ownership stakes of individual PIDs that exceed 5%) from other blockholdings, and from the total ownership of PIDs in individual companies. However, the sum of blockholdings and ownership stakes of PIDs are not strongly correlated (the correlation coefficient is +0.22), which reduces the extent of the potential multicollinearity problem in the estimations.
Table 7.11: Regression results for the log of the turnover ratio of traded stocks (dependent variable) on the blockholdings of PIDs and on the ownership stakes of all large shareholders. Instead of total market capitalization, the free float of shares is used to calculate the turnover ratio. Regressions are run separately for 1996 and 1999, and for the pooled 1997-1999 data. t-values are between the brackets.

<table>
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<td>constant</td>
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<td>1.222***</td>
<td>0.986***</td>
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<tr>
<td></td>
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<td>(0.078)</td>
<td>(1.087)</td>
<td>(6.820)</td>
<td>(6.388)</td>
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<tr>
<td></td>
<td>(0.643)</td>
<td>(-2.340)</td>
<td>(-4.475)</td>
<td>(-6.990)</td>
<td>(-8.929)</td>
</tr>
<tr>
<td>B_{PIDs}</td>
<td>-2.395</td>
<td>-1.265</td>
<td>-0.978</td>
<td>-2.189**</td>
<td>-1.682***</td>
</tr>
<tr>
<td></td>
<td>(-0.779)</td>
<td>(-0.805)</td>
<td>(-1.569)</td>
<td>(-2.319)</td>
<td>(-2.925)</td>
</tr>
<tr>
<td>D_{97}</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.668***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(-2.638)</td>
</tr>
<tr>
<td>D_{98}</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.296*</td>
</tr>
<tr>
<td>R^2</td>
<td>0.04</td>
<td>0.08</td>
<td>0.27</td>
<td>0.38</td>
<td>0.30</td>
</tr>
<tr>
<td>N</td>
<td>33</td>
<td>63</td>
<td>78</td>
<td>115</td>
<td>319</td>
</tr>
</tbody>
</table>

***Statistically significant at 1%.
**Statistically significant at 5%.
*Statistically significant at 10%.
significant negative impact on this measure of market liquidity. Even after controlling for the cumulative shareholdings of other large investors and for time, the market liquidity of listed shares decreases with the percentage of shares held by PIDs (see the last column of Table 7.11). According to our (pooled) model, a firm with no blockholdings and zero ownership by PIDs would have an annual modified market turnover ratio of 119% in 1998. If blockholders own 20% of the firm’s equity and PIDs 10%, then the annual liquidity of its shares drops to 83%. If the ownership of blockholders and PIDs increases three times, the annual liquidity of a company drops to 14%. The annual liquidity of a company that was fully owned by PIDs and in which PIDs were holding blocks of at least 5%, would be 1% in 1998. These percentages would be higher for 1999, and lower for 1997.

There are not many studies to which we can directly compare our results. Within a completely different institutional framework, Becht (1999) finds a negative impact of cumulative blockholdings on the market liquidity of a sample of Belgian and German exchange-listed shares. The values of the coefficients of cumulative blockholdings in our regressions are generally higher than the coefficients for Belgium and Germany that Becht (1999) estimated. It is interesting, however, that the coefficients of PID ownership in our regressions have about the same magnitude as those that Becht estimates for the cumulative blockholdings. Note also, that we use a slightly different (and better) measure of liquidity than Becht (instead of total market capitalization we used the free float of shares when we calculate the turnover ratio).

Despite the plausible results, a great deal of caution is required with such comparisons. The large investors in Germany and Belgium are very different from PIDs. Among others, they were established for a different purpose than were PIDs, and they have a more normal portfolio structure. We would face similar problems if we compared our results with those from the studies of the US markets which we mentioned in Chapter 4.

ii) Extensions

Because annual market turnover is a very crude measure of the liquidity of individual shares, we extend our analysis to other liquidity measures and we include foreign ownership of the traded shares as an additional explanatory variable. The results of these additional regressions are explained below.

**Foreign ownership**  As the first extension of the basic regression above we add information on the foreign ownership of shares in the listed companies. We check whether foreign shareholdings have any impact on the (log of the) turnover ratio, i.e. the ratio of trading volume (in SIT) to the end-of-year free float of shares.⁴⁰ We use the same pooled 1997-1999 data.
Chapter 7. Mutual funds and the Slovenian equity market

dataset as before, but we add a dummy variable $D_F$ which takes a value one if foreigners hold shares in the company, and zero otherwise. We also include the market capitalization of each share to see whether size has any impact on liquidity of individual stocks.

The average ownership by foreign investors decreased from 4.78% at the end of 1997 to 3.40% at the end of 1998 and further on to 3.07% at the end of 1999. Nevertheless, the regression results in column (1) of Table 7.12 show that foreign ownership has a significant and negative impact on the annual turnover ratio. Because the restrictions of the Bank of Slovenia made short holding periods of shares by foreign investors particularly unattractive (and expensive), this result may not come as a surprise. Longer investment horizons of foreigners may be one explanation for the negative effect of foreign ownership on the liquidity of shares. The latter was lower in 1997 than in other years.

**Other measures of liquidity based on trading volume** So far we have only employed the annual turnover ratio of shares as a measure of their liquidity. Here, we will use some additional simple proxies for liquidity that have been suggested in the literature and run similar regressions as before. From daily data we calculate the following: the average daily traded value in SIT, $\overline{V}$, the average daily trading volume in shares, $\overline{Q}$, and the average daily percentage of outstanding shares traded, $\overline{Q}/%$. The averages are calculated over three years (1997-1999). To account for the fact that shares of companies with larger market capitalization typically have larger trading volumes we normalize the average daily traded value and the average daily trading volume in shares by the total market capitalization ($C$) of each included stock.

Regression results in Table 7.12 are qualitatively the same as before, except that the $R^2$s are now somewhat lower. The ownership stakes of PIDs have a negative impact on trading volume, even after we control for the size of the companies and the cumulative shareholdings of other large investors. Foreign ownership decreases trading volume further. The sign of the coefficient of cumulative blockholdings is not stable (it changes with the measure used).

**Liquidity measures based on market prices** Finally, we look at whether the negative impact of cumulative blockholdings and PID ownership is preserved if we apply measures of liquidity that take into account daily market prices. We calculate three variants of Amihud’s measure of illiquidity as discussed in Chapter 3. The first one is the daily percentage price change divided by the daily trading volume (in SIT thousand), $\frac{\% \Delta P}{V}$. It serves as a rough measure of the price impact of the daily order flow. In addition, we construct two variations of this measure, replacing Amihud’s numerator by a difference between the daily highest and lowest price, $P_{MAX} - P_{MIN}$, and with the difference between the best daily ask and the best daily bid price, $P_{ASK} - P_{BID}$. In addition to these illiquidity ratios, we calculate a kind of proportional daily spread which we define as the difference shares.
7.5. PIDs and the equity market’s liquidity

Table 7.12: Regressions results for different liquidity measures. We use the pooled (1997-1999) data, which excludes the shares of PIDs. 256 observations are included in each regression. The dependent variable is shown in the first row of each column. t-values are between the brackets.

<table>
<thead>
<tr>
<th></th>
<th>log(ratio) (1)</th>
<th>Q% (2)</th>
<th>V/C (3)</th>
<th>Q/C (4)</th>
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<tr>
<td><strong>constant</strong></td>
<td>1.079***</td>
<td>-0.004**</td>
<td>12.919**</td>
<td>17.835**</td>
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<td>(2.382)</td>
<td>(-2.000)</td>
<td>(2.456)</td>
<td>(2.279)</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>-3.192***</td>
<td>0.00001</td>
<td>8.220</td>
<td>-2.441</td>
</tr>
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<td></td>
<td>(-5.184)</td>
<td>(0.009)</td>
<td>(1.346)</td>
<td>(-0.449)</td>
</tr>
<tr>
<td><strong>B_{PIDs}</strong></td>
<td>-1.334**</td>
<td>-0.004**</td>
<td>-18.437***</td>
<td>-16.166**</td>
</tr>
<tr>
<td></td>
<td>(-2.011)</td>
<td>(-1.975)</td>
<td>(-3.465)</td>
<td>(-2.507)</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>0.022***</td>
<td>-0.000004</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4.020)</td>
<td>(-0.391)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>D_F</strong></td>
<td>-0.724***</td>
<td>-0.002**</td>
<td>-9.443***</td>
<td>-10.412***</td>
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<td>(-2.629)</td>
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<tr>
<td><strong>D_{97}</strong></td>
<td>-0.487*</td>
<td>-0.0009</td>
<td>-0.742</td>
<td>-1.535</td>
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<td>(-1.796)</td>
<td>(-1.125)</td>
<td>(-0.370)</td>
<td>(-0.639)</td>
</tr>
<tr>
<td><strong>D_{98}</strong></td>
<td>-0.082</td>
<td>-0.001**</td>
<td>-1.901</td>
<td>-3.314*</td>
</tr>
<tr>
<td></td>
<td>(-0.437)</td>
<td>(-2.179)</td>
<td>(-0.950)</td>
<td>(-1.817)</td>
</tr>
</tbody>
</table>

R^2 | 0.18 | 0.10 | 0.16 | 0.13 |

***Statistically significant at 1%.
**Statistically significant at 5%.
*Statistically significant at 10%.
between the best daily ask and the best daily bid price, divided by the average daily transaction price, \( \frac{P_{\text{ASK}} - P_{\text{BID}}}{P} \). All liquidity measures are averaged over each share and each year in the period 1997-1999. Explanatory variables are the same as in columns (1) and (2) of Table 7.12.

If blockholdings and PID ownership hamper the liquidity of individual shares then the two variables should be positively related to the measures of illiquidity its cost. In this case, the regression coefficients for \( B \) and \( B_{\text{PID}} \) in Table 7.13 should be positive. Regression results support this hypothesis with respect to the cumulative shareholdings. The higher the latter, the higher the illiquidity of individual shares in the pool. Shares of larger companies are more liquid and their illiquidity is lower. We do not find clear evidence that PID ownership increases the illiquidity of traded shares, however. Foreign ownership does not show as statistically significant explanatory variable in these regressions and there is some evidence that illiquidity was higher in 1997.
7.5. PIDs and the equity market’s liquidity

Discussion

Our empirical analysis delivers some interesting results. First, the impact of ownership concentration, measured by the cumulative ownership stakes of large shareholders, on the liquidity of the Slovenian equity market is negative. This result is robust. Whether we use a simple annual turnover ratio, an illiquidity ratio or a daily spread as a dependent variable, the impact of large shareholdings on liquidity remains negative. Furthermore, one particular group of shareholders, namely PIDs, further reduces the market liquidity of listed shares, even after controlling for size of firms and for foreign ownership.

Note that the results of the analysis of the impact of large shareholdings on the liquidity of shares of PIDs are comparable to those of non-PID shares. The liquidity of PID shares is neither consistently better nor worse than the liquidity of other listed shares. According to our estimations (not shown here), large shareholdings increase the illiquidity of PID shares even more than in the case of other shares, but not significantly so. The effect of ownership concentration does not seem to depend on the issuer of shares.

The negative impact of PIDs could be interpreted as evidence of their control aspirations. The initial stakes of individual PIDs in the listed companies were small, but they increased over time for PIDs as a group. It is not straightforward why PIDs should act as holders of shares today. PIDs are no substitutes for the state’s ownership in the listed privatized firms. The Capital Fund, the Restitution Fund, or the Slovenian Development Fund could be viewed as such, not PIDs. Shares of PIDs are widely held, mostly by individuals. Only the management companies seem to have been increasing their ownership stakes in PIDs recently. This could be the result of their management fees being paid out mostly in shares of PIDs.

One additional aspect of PIDs should be emphasized. The agency problems between owners of PIDs and their managers are considered to be huge. Although the individual investors should at some point receive some return on their investment in PIDs, this may not be in the interest of the management company. Due to their low individual holdings, small shareholders of PIDs are neither legally able nor financially motivated to control the management companies. If PIDs are not able to provide sufficient returns through their asset management function they should transform themselves into something else. The transformation of PIDs into multiple legal forms might put their shareholders into an unequal position. Namely, when investors initially chose where to put their certificates, all PIDs looked virtually the same. After the transformation of PIDs, there will be substantial variation among the successors to PIDs.

The negative impact of large shareholders on the liquidity of listed shares can to some extent be neutralized by their positive influence on the management of the firms. The

41Due to statistical insignificance these results are not included in the text.
anecdotal evidence however suggests otherwise. There is little evidence that PIDs have been beneficial either for the value of their companies or the liquidity of their shares.

### 7.6 Concluding remarks

In this chapter we have analyzed the influence of PIDs, the Slovenian closed-end mutual funds, on the liquidity of shares traded on the Ljubljana Stock Exchange (LJSE). We show that PIDs are growing fast in terms of asset value. Together with the much smaller open-end funds, the assets of PIDs already represent over 20% of Slovenia's GDP. However, almost half of PID assets are still in the form of ownership certificates. Excluding certificates, corporate shares represent more than 90% of the total PID portfolios. Through the purchases of shares and equity stakes on and off the exchange, PIDs are becoming larger shareholders in the listed and unlisted firms each year. Open-end mutual funds are still too small to have any impact on the equity market. If PIDs ‘opened’, the resulting open-end funds would have a much larger potential for influencing the equity market and its liquidity.

We have looked at two aspects of the impact of PIDs on the equity market’s liquidity. First, we considered the introduction of shares of PIDs to the LJSE. We find little evidence that the increasing contribution of PID shares to the total equity market’s capitalization positively influenced the trading volume of non-PID shares and their liquidity in 1998-1999.

The second aspect of PIDs’ impact on market liquidity is related to the ownership structure of LJSE-listed firms. The ownership stakes of PIDs and other large shareholders show a negative impact on the liquidity of the Slovenian equity market. This result concurs with recent theoretical contributions which suggest that the impact of large shareholdings on market liquidity can be negative. It is also in accord with the empirical evidence for some other continental European countries. The results are robust. Whether we use measures that reflect the costs of illiquidity or the level of trading activity in listed shares, we get similar results. In addition, the foreign ownership of listed securities shows a negative impact on the different measures of liquidity.

There is a large set of compelling research questions that concern mutual funds and their impact on the equity market in Slovenia. The performance evaluation of PIDs and the impact of PIDs on the performance of the firms they own are two such issues. The consequences of the dominant position of closed-end mutual funds for the efficiency of the financial system also deserve further study. In addition, PIDs are financial institutions within which agency problems between the fund managers and the owners of the funds may be serious enough to call for additional research.

Finally, studies of the less developed financial systems (such as Slovenian) still lack the
7.6. Concluding remarks

analysis of high-frequency data. Empirical research of this type might provide valuable insights into the effects of institutional trading on equity markets in these countries. In the case of developed financial markets, the shift towards the study of aggregate effects of fund trading and aggregate determinants of liquidity has been observed instead (see Chordia et al. (2000a), for example).
Chapter 7. Mutual funds and the Slovenian equity market

7.A Institutional background of PIDs

PIDs are a relatively unusual part of the Slovenian financial system. They were created by the Law on the Transformation of Ownership of Business Enterprises of 1992 as an indirect way of making the citizens of Slovenia the shareholders of Slovenian firms. Based on this Law, each citizen, depending on his/her age, received an ownership certificate (a voucher) worth between DEM 2500 and DEM 5000 for free. The ownership certificate gave each holder the right to buy shares. Its monetary value was registered in a special registration account that was opened for each citizen. Ownership certificates could only be exchanged for shares of transformed, i.e. 'privatizing', enterprises (through public offerings, by participating in internal distribution and internal sale of shares) and for shares of PIDs. PIDs were created to buy shares of the privatizing companies on behalf of investors, either during public offerings or through the auctions organized by the Development Fund. The Development Fund acquired 20% of shares of each privatized firm in Slovenia. Shares of PIDs themselves became transferable when PIDs became listed on the stock exchange.

PIDs have a few features that distinguish them from regular closed-end funds. First, they were initially selling their shares for ownership certificates (not cash), and they could only purchase pre-determined assets (limited choice). Second, the nature of PID assets closely resembles the assets of venture capital funds (Žnidarsič-Kranjc (1998)). To make matters even more complicated, PIDs are not able to convert all certificates into financial assets. This became known as the problem of a 'black hole' in the assets of PIDs, sometimes also called the 'privatization gap'. PIDs claim that the size of the assets available to them is not sufficient to cover the value of ownership certificates they have collected. The 'hole' is estimated to amount to about 10% of Slovenia's 1998 GDP (Ribnikar (1998)). As a consequence, PIDs are demanding additional assets from the state to 'use up' the remaining certificates.

Another way to fill this shortage of assets, and simultaneously provide the base for the funded second pillar of the pension system, would be to transfer the shares of PIDs which are backed by ownership certificates to the individual accounts of the second pillar voluntary pension fund (Ribnikar (1998)). This idea was incorporated in the Law on the First Pension Fund of the Republic of Slovenia and Transformation of the Authorized Investment Companies that was passed in June 1999. Contrary to expectations, only 3.4% of shareholders of PIDs used this additional 'right to choose' and converted their shares within the given period. The low response may be due to factors like the lack of information and publicity, the late reaction of the authorized management corporations etc. Whatever the reasons, PIDs preserved their asset base and will be offered additional assets in one way

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42 Only the current and past employees of the firms, and their relatives were able to participate in the 'internal' distribution and sale of shares.

43 Note that the state today owns a larger part of the corporate sector than it did before 'privatization.'

or another.

The history of PIDs seems to go hand in hand with the reform of Slovenia's pension system. The events in the second half of 1999 are just part of this joint process. PIDs would probably never have achieved today's status if the reform of the state pension system as suggested and discussed by Ribnikar (1998) took place. The essence of that proposal was to transfer the shares and ownership stakes of all (previously) socially-owned companies to pension funds, not mutual funds. Hence, PIDs can be viewed as the joint product of the Slovenian mass 'privatization' process and the pension system reform. As a consequence, PIDs are often not considered to be 'real' financial intermediaries in the Slovenian academic community (see Ribnikar (1999)). According to Ribnikar (1999), PIDs do not facilitate the transfer of funds from households to enterprises. They perform two functions that have no positive effects on the corporate sector: i) they enable their shareholders to sell shares which they acquired for free and thereby induce consumption and reduce savings in the economy; and ii) through sales and purchases of shares PIDs modify their portfolio structure in terms of concentration, not diversification (Ribnikar (1999)).\footnote{The role of the stock market is criticized for its similar function: it does not facilitate the transfer of funds to the corporate sector but instead helps individuals to sell what they received free of charge (Ribnikar (1999)).} If we adopt such a view of PIDs, studying the impact of PIDs on the official equity market may even seem futile. However, the growth of their asset base and their ownership stakes in the companies seem to be significant enough to warrant more research.
7.B Open-end mutual funds and the equity market (liquidity)

In terms of number and asset value, open-end funds represent only a small part of the Slovenian mutual fund sector. The asset value of all open-end funds together represents less than 2% of the total asset value of PIDs in 1995-1999 (see Table 4). Even if we exclude ownership certificates from the assets of PIDs, this percentage does not exceed 3%. The average open-end fund in our quarterly mutual fund database (described in Section 3) has a total asset value of SIT 0.23 billion, and is about fifteen times smaller than the average PID.

At first sight, the composition of assets of open-end funds looks significantly different from PIDs. Without ownership certificates, their portfolio structure looks quite similar. Figure 7.9 shows that shares are the single most important investment category of the open-end funds. They are followed by bonds, bank deposits and cash and short-term securities. Among short-term assets, the securities issued by the Bank of Slovenia are predominant. These asset categories were prevailing during the whole 1994-1999 period. The proportion of shares in the portfolios of open-end funds is rising. This rise comes primarily at the expense of bonds and bank deposits. At the end of 1999, shares represented almost 79% of the total assets of open-end funds.

Compared to the average PID in our September 1996-June 1999 database, the average open-end fund holds a lower percentage of assets in shares (56%), and invests more in bonds (25.9%). In order to meet the liquidity requirements prescribed by law, the average open-end fund also invests more in short-term securities (9.4%) and in cash (3.3%). Relative to the average PID, a higher proportion of shares in the portfolio of the average open-end fund is traded on the organized equity market than off-exchange (51% and 5%, respectively).

Based on the recent portfolio structure of open-end funds, we might expect that the index MF, which we created to reflect movements of the net asset value per unit of an average open-end fund, would be highly correlated with the stock market index SBI. In addition,

\[ SBI_t = \frac{\sum_{i=1}^{N} (p_{t,i} \times q_{T,i})}{\sum_{i=1}^{N} (p_{0,i} \times q_{T,i})} \times 1000 \times K_t \]

where \( N \) is the number of shares included in the index, \( p_{t,i} \) is the average price of stock \( i \) on day \( t \), \( p_{0,i} \) is
the correlation coefficient between the MF and the SBI should be higher than the correlation between the indices SBI and PIX. In Figure 7.10 we plot the daily values of the PIX index, the values of the stock market index SBI, and the values of the MF index in the first half of 1999. Contrary to our expectations, the correlation coefficient between the daily values of the PIX and the SBI in the first seven months of 1999 is higher (+0.85) than the correlation coefficient between the MF and the SBI (+0.76). We discuss the way in which Slovenian open-end funds might affect the stock market index in the future in what follows.

the average price of stock $i$ on January 1, 1997. $q_{T,i}$ is the number of $i$ shares listed on the exchange on the day of setting (or changing) the weights, and $K_t$ the adjusting factor for ensuring the index's comparability over time. The MF index is calculated as a weighed average of daily changes in the net asset value per unit of each mutual fund. The weights are the percentages of each fund's net asset value in total net asset value, and they change daily.
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Figure 7.10: Daily values of the indices SBI, PIX and MF in the period January 1999-June 1999. For comparison, all indices are recalculated using the values of Dec 30, 1998 as a common base (Dec 30=1000).

7.B.1 Money flows to open-end funds and market prices

One of the advantages of the ‘openness’ of mutual funds is the transparency of the prices of their assets. This enables investors to follow their net asset value on a daily basis. The daily total net asset value of the Slovenian open-end funds in the period January 1996-June 1999 is depicted in Figure 7.11. It shows a positive trend that may be attributed to the positive returns on the assets in the funds’ portfolios, and to the net flows of money into mutual funds (the net flows of money into open-end funds are plotted in Figure 7.12.\(^48\)).

An empirical relationship between net flows of money to the open-end funds and the market prices (and returns) of shares has been found to exist in some equity markets. In the US, for example, where institutions account for over 60% of the overall NYSE equity trading, the flow-induced trading by mutual funds is one of the key determinants of the level of share prices (Edelen and Warner (1999)). This notion inspired many recent empirical studies

\(^{48}\)When plotting daily net flows we excluded the period January-March 1996, when each fund only consisted of one unit and had no flows of money, and the first two days of April 1996, when the funds received enormous amounts of money and started operating ‘normally.’
on the impact of flow-motivated institutional trading on (aggregate) market prices and returns. Edelen and Warner (1999), for example, find a statistically significant long-run equilibrium relationship between the net flows of money into mutual funds and the level of stock market index on a large sample of US mutual funds. The impact of net money flows to open-end funds on the daily stock market index (its returns) in the LJSE is marginal and statistically insignificant. Considering the size of the flows, this is not surprising. In a few years, the results of a similar analysis might

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49 See Warther (1995), Mosebach and Najand (1999), Edelen and Warner (1999) etc. Edelen and Warner (1999), for example, analyze daily and intra-day data and conclude that within the trading day market returns respond to a new flow of money into mutual funds, while the daily flow responds to the information that drives the returns (with a lag). Their and other similar empirical studies suggest that aggregate flow can be used to study the aggregate price effect of institutional trading.

50 Using daily data on net payments of individual open-end funds provided by the Securities Market Agency, we look at whether net money flows to open-end funds have any impact on the stock market index SBI and its returns. We use data from April 3, 1996 until July 31, 1999. We excluded the first three months of our abovementioned dataset because netflows were zero in this period. The first two days in April are excluded because there was a large net inflow of money into mutual funds due to the start-up of a few new funds. We search for the best specification of the model that can explain the variation in net flows of money to the open-end funds. We normalize net flows by dividing them by the total net mutual fund net asset value of the previous day. We use concurrent and lagged returns on the SBI and lagged net flows.
look very different depending on the legal and organizational form that PIDs will choose or be advised to adopt in the coming year(s). Due to their larger asset base, it would be reasonable to assume that money flows into ‘open-ended PIDs’ would play a more important role for the organized equity market than current open-end funds in the past two years. The opening of PIDs would almost automatically translate into a stronger presence of open-end funds in the Slovenian equity market.

A few factors may work against the growth of open-end funds in the future. Unfavorable taxation of investments in mutual funds (relative to deposits with banks, for example) is one such factor. Moreover, if the proposed changes to the Law on Investment Funds that preclude PIDs from transforming themselves into open-end funds that are currently under discussion were accepted, the development of open-end funds would be limited further.

![Figure 7.12: Net flows of money (in SIT million) into mutual funds in the period 1996-1999.](image)

and flows as a set of explanatory variables. Net flows and market returns, measured as the daily change in stock market index SBI, are positively correlated, but the correlation coefficient is relatively low (+0.05). The first lag of net flows, the market return of three days before, and the moving average term of the first order turn out to be statistically significant explanatory variables. Like Edelen and Warner (1999), we use the residuals of this regression, i.e. the unexplained or ‘unexpected’ net flows as an explanatory variable in the regression for the daily percentage return on the SBI index. No matter which specification we use, the unexplained fund flows, their lags, and the lagged return on the SBI index do not explain more than 4% of the variation in market returns. Moreover, the regression coefficients of unexplained flows are statistically insignificant at the usual levels.