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The Effects of Dual Listing on Share Prices and Liquidity in the Absence of Registration Costs

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ABSTRACT

In the year 2000, *the Israeli Securities Authority* (*ISA*) *initiated a new amendment to the Securities Law aimed at promoting dual listing of Israeli companies, already traded in the US, and not in Israel, by exempting them from the burden of additional reporting to the ISA. According to this amendment, the ISA agreed to rely solely on the reporting requirements of the US SEC. Since then, more than* 30 *Israeli companies, traded on Nasdaq decided to list their shares on the TASE as well. This event allows us to examine the effect dual listing had on share prices and liquidity in a unique setup that annuls the costs of dual listing registration. The main findings are as follows*: 1) *trade volume of the dual listed companies has grown by about* 123% *on*; 2) *about* 42% *of the total volume is on the TASE without adversely affect the trading volume on the Nasdaq*; 3) *as a result, share prices went up by about* 9%. *One possible policy implication of these findings is the positive influence harmonized supervision may have over international capital markets such as the Single Passport in Europe.*

*Keywords***:** *Dual Listing*, *Liquidity*

1. Introduction

In the year 2000, a 'Dual-Listing Law' was amended to the Securities Law with the intent of promoting dual listing on the Tel Aviv Stock Exchange (TASE). The amended law exempts firms already traded in the US from the burden of reporting to the ISA (Israeli SEC) in addition to the US reporting requirements.[1] Following this amendment more than 30 Israeli companies, traded on NASDAQ, decided to dual list their shares on the TASE.

This unique event allows us to examine the effect dual listing has on share prices and liquidity, in almost laboratory conditions given that the new "dual-listing law" annuls registration costs and other regulatory costs typical to multiple listing in foreign countries. The importance of examining these issues goes beyond the Israeli capital market considering the immense effort made by International Organization of Securities Commissions (IOSCO) in recent years to harmonize the supervision

over world financial markets and considering Europe's harmonized disclosure regime (Single Passport) that allows for a significant reduction in the costs of raising capital in various capital markets of the EU (European Directive 8).[2]

The sample consists of 30 firms, whose shares were traded only on the Nasdaq, that took advantage of the easements in the law, to dual list their shares for trade on the TASE as well. Contrary to previous studies examining this issue, the costs of dual listing these companies on the TASE are negligible since the listing requires only a notification to the TASE and ISA and does not require prospectus and additional reporting to them beyond those required in the US.

Dual listing of shares, outside the local market, is common to many international financial markets. In recent years, the number of companies seeking to raise capital in foreign markets had risen dramatically and motivated the discussion in the literature regarding costs and benefits of dual listings in foreign capital markets. The economic rational that underlies this phenomena is that such a decision is expected to take place when bene-

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[1]Without this amendment to the Securities Law, companies traded in the US were required to submit a prospectus to the ISA, receive a permit for publishing it, and present current and immediate reports, in accordance with the Israeli law, the GAAP and starting in 2008 – the IFRS.

[2]In January of 2008, the dual listing law was extended to the French market too.

fits of the aforesaid registration are comparatively higher then the regulatory costs of registering them [1]. Thus, in theory, dual listing on foreign capital markets may have either positive, negative or no influence at all.[3]

The negative influence might stem from additional costs incurred by the other market regulator [8]. These costs include, among other things, the cost of issuing, the cost of adjustment to a foreign market, adjustment to different standards and disclosure requirements for investors by means of financial reports, immediate reports, etc. They might also explain why companies decide to register their shares for trade on a foreign market, where disclosure requirements are less stringent, rather than on markets with tighter regulation.[4]

The positive influence of dual listing emanates primarily from potentially improved liquidity and share prices, increased exposure of the company to a larger pool of clients on other markets, higher likelihood of raising capital at a relatively low cost, due to easier and cheaper access to other sources of capital and a more efficient transfer of information to investors [5,7,11,12]. The positive influence is also consistent with Metron's model [7] and Hauser-Lauterbach findings (2005) that the broadening of the investment base positively affects share prices and liquidity.

Some of these claims were examined by Bancel and Mitto [13] who had carried out a survey among European managers of their opinion on the costs and benefits of dual listing in a foreign country. The main finding was that about 60% of the respondents thought that the benefits of dual listing outweigh the costs. In the opinion of the mangers respondents, the main benefit is increased liquidity and improvement in the quality of the reporting (full disclosure). Bancel and Mitto [13] also found that when these benefits are negligible, the effect of dual-listings turns to be negative.

In light of the aforesaid, we hypothesize that dual listing is beneficial - improved liquidity and higher share prices - if the listing costs and/or additional regulatory costs are negligible.

2. Data and Methodology

2.1. Data

Table 1 below lists the 30 dually-listed firms included

Table 1. Sample.

NASDAQ Ticker	Announcement Date of Dual Listing	Market Value (Millions of NIS)
MGIC	13/11/2000	611.6
MTLK	28/11/2000	794.6
SCIX	03/11/2000	1,312.7
TSEM	07/01/2001	579.0
BPHX	16/01/2001	393.3
JCDA	13/06/2001	339.3
MAGS	25/06/2001	201.6
PTNR	28/06/2001	3,889.2
ALVR	22/07/2001	489.0
AUDC	10/10/2001	424.9
CGEN	27/12/2001	610.8
BOSC	01/01/2002	112.4
LNOP	24/03/2003	403.5
ORCT	15/05/2002	197.4
NVMI	16/06/2002	192.7
MNDO	08/07/2002	119.2
RVSN	15/10/2002	448.7
SPNS	03/03/2003	213.4
FNDT	14/08/2003	401.8
GILT	19/02/2004	701.6
GIVN	22/03/2004	3,612.7
RDWR	10/05/2004	1,343.2
ALDN	22/07/2004	985.4
CRNT	06/09/2004	509.8
IGLD	28/02/2005	649.5
PRGO	06/03/2005	5,778.3
TATTF	03/08/2005	214.5
CAMT	15/12/2005	240.3
SILC	22/12/2005	168.3
RDCM	13/02/2006	305.0

This table lists the companies included in the sample used in this study that consists of Israeli companies, that were first listed for trade on the Nasdaq and which decided to dual list their shares on the TASE as well following the "Dual Listing Law".

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[3]Howe, Madura and Tucker [2] found evidence that share prices decline following their dual listing outside the US. Howe and Kelm [3], Damoradan and *et al.* [4], also found negative influence dual listing in foreign countries had on share prices. However, Saudagaram [5], Mitto [6], Merton [7] and others pointed out possible improvement in share prices due to company's exposure to capital markets offering additional possibilities for raising capital as well as increased efficiency in transfer of information, which might reduce the cost of capital and raise firms' value.

[4]See, for example, Fuerst [9] and Cantale [10].

the sample. All of them were first listed for trade on the Nasdaq and only then decided[5] to list their shares on the TASE, following the "Dual-Listing Law" that exempted them from further reporting obligations in addition to the ones required by the US SEC.

The data include daily share prices in the US of each company, TA100 stock index in Israel and composite NASDAQ stock index in the US.[6] It covers a period that commences 3 years prior to the announcement of dual listing in Israel, and ending 3 years after the announcement. The data also include trading volume of each company in both markets commencing two months prior to the dual listing day and ending two months afterwards.[7] All of which, were taken from yahoo-finance. The trading volume on the TASE was translated daily from NIS to $US, according to daily representative exchange rate (NIS/$US) obtained from the Central Bank.

2.2. Methodology

We start with a comparison of the average daily trading volume in the two months preceding the dual listing day of the TASE to that of the two months following that day. Then, we conduct an event study to measure the excess rates of return in a 30-day window that starts fifteen days prior to the TASE announcement day. The excess rates of return were calculated based on daily share prices in the US and those of the TA100 and Nasdaq indices in Israel and the US, respectively according to the following model: $\varepsilon_{it} = R_i - \alpha_i - \beta_i^{US} R_{m\_US} - \beta_i^{IS} R_{m\_IS}$ where m signifies the stock index in Israel (IS) and in the US.[8] The parameters of the market model were estimated on the basis of daily data, of the six months preceding the 30-day period used for the event study. Then, we have analyzed, by means of regression, the effect of liquidity

on share prices.

3. Empirical Findings

3.1. Liquidity

The positive influence of dual listing emanates primarily from potentially improved liquidity and share prices, increased exposure of the company to a larger pool of clients on other markets, higher likelihood of raising capital at a relatively low cost, due to easier and cheaper access to other sources of capital and a more efficient transfer of information to investors. The positive influence is also consistent with Metron's model [7] and Hauser-Lauterbach findings (2005) that the broadening of the investment base positively affects share prices and liquidity.

Table 2 presents the findings regarding changes in the liquidity of each share following the dual listing. We find that trading volume had risen, on average, from about $128,000 per share to about $ 378,000, following dual listing. This figure represents a rise of about 123% in the overall trade volume in the US and Israel, of dual listed companies, when compared to the trade volume in the US alone prior to the dual listing. We also found that 23 of 30 firms in our sample had experienced a positive change in their trade volume. Following the dual listing day, about 42% of the overall trading volume was done on the TASE, without affecting the trade in the US. In the US, we have found an insignificant rise of 1.3% (p - value = 0.900) in the trade volume of shares on NASDAQ,

Table 2. The influence of dual listing on trading volume.

	Average	Median
Trade volume before (in the US)	127,952	52,139
Trade volume after (Israel and the US)	377,906	188,722
p-value	(0.044)	(0.019)
% change in the overall trade volume	123%	63.3%
p-value	(0.001)	(0.001)
% change in trade volume in the US only	1.3%	2.4%
p-value	(0.900)	(0.827)
% trade volume in Israel out of the total trade volume in Israel and in the US	42.5%	31.5%
p-value	(0.000)	(0.000)

The table presents statistical data of daily trading volume during the two months preceding the beginning of trading on the TASE and during the two months following that day. The trading volume during the two months, following dual listing, includes trading in Israel along with that on the Nasdaq. The trading volume on the TASE in NIS, was converted into US$ according to the daily exchange rate. Numbers given in brackets represent p-value, for examining the hypothesis that the average or median are not significantly different from zero.

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[5]The study considers only firms that decided to cross list their shares and nit all firms that eligible to do it but chose not to do it. One could argue when coupled this fact with the possibility that only firms with good future prospects cross-listed their shares the results suffer from selection bias. Although the paper does not explicitly address this problem, we believe that our sample does not suffer fro selection bias for two main reasons. First, the dual-listing rules apply to firms with market capitalization higher then 250 million dollars and most of them did cross-list their shares. Second, few firms chose not to do it. One of the is Check Point who had excellent future prospects during the sample period and chose not do it because their share were very liquid un the market.

[6]We assume that share prices behavior in Israel is similar to that in the US. See [14].

[7]At times, the reported trade volume on NASDAQ is divided into two, since all the trade is carried out through market makers that act as brokers. In fact, market makers buy to their accounts and later sell from their accounts to various clients. In this study we didn't divide the NASDAQ trading volume into two. If we were to do so, the positive results would have been even more dramatic. The results were practically the same when we different lengths of window for the trading volume.

[8]We also used Equation (1) to estimate the excess rates of return and found that the results were pratically the same.

indicating the growth in trade volume stems primarily from the opportunity to trade on the TASE. One of the possible explanations is that the costs of buy- sing and selling shares on foreign capital markets were too high for most Israeli investors prior to the dual-listing.

It should be noted that the finding that dual listing had a positive effect on trade volumes does not change even when we deduced the change of the total trade volume on the TASE during the sample periods On average, there was a non significant drop in the trade volume of shares (about 2.22%) on the market as a whole, in the two months period after that date relative to that in the two months prior to the dual listing day.

These findings appear to be inconsistent with Bancel and Mitto [13] and others who found that when these benefits are negligible, the effect of dual-listings turns to be negative. We argue that the positive effect we find is due to the absence of registration costs for dual listings and that in such case there is a clear benefit to dual listing, mainly due to increased liquidity.

3.2. Share Prices

Table 3 and **Figure 1** present results on the effect of dual listing on share prices. The main finding is a significant rise in share prices, CAR $(-15,14) = 8.9\%$, on average (p - value = 0.028), and in the median, CAR $(-15,14) =$ 14.3 % (p - value = 0.028) suggesting that the dual listing had a significant positive effect on share prices.[9] These results are reinforced when we considered the effect on share prices up to three months after the announcement date of the dual listing. It appears that although the excess rates of return from the 15th day to the 90th day following the announcement of dual listing are negative, CAR $(15,90) = -0.06$, they are not significant (p - value = 0.367). These results differ from most studies, which found that, in the short term, there is a rise in the rate of shares, prior to trade registration, and a significant drop - following it (for example - [10,15,16]).

3.3. Share Prices and Liquidity

According to Amihud and Mendelson [17] and others, improved liquidity is expected to have positive effect on share prices. We used the Newey-West HAC Standard Errors & Covariance method to estimate the following regression model:

$$CAR(-15,14)_i = 0.097274 + 0.004709 d\_Volume_i + \varepsilon \ (1)$$

(p - value =) (0.040) (0.0629) $R^2 = 0.041$

[9]These results are robust to other models used to estimate CAR, such as regression model (1).

Table 3. Cumulative Abnormal Returns (CAR) around the announcement day of dual listing on the TASE.

T	AR(-15,T) -%	p-value	CAR(T) - %	p-value
−15	0.26	0.688	0.26	0.688
−14	−0.24	0.686	0.02	0.984
−13	0.37	0.507	0.39	0.694
−12	0.61	0.328	1.00	0.399
−11	−0.95	0.298	0.05	0.967
−10	−0.12	0.867	−0.08	0.964
−9	0.15	0.869	0.08	0.969
−8	1.37	0.108	1.44	0.560
−7	0.40	0.670	1.84	0.482
−6	0.19	0.777	2.03	0.466
−5	−2.70	0.065	−0.66	0.830
−4	−0.30	0.774	−0.97	0.743
−3	−0.84	0.279	−1.81	0.543
−2	1.06	0.335	−0.75	0.808
−1	0.00	0.996	−0.75	0.805
0	1.40	0.050	0.65	0.839
1	1.08	0.141	1.73	0.588
2	0.64	0.460	2.37	0.460
3	0.72	0.362	3.09	0.344
4	1.06	0.168	4.15	0.208
5	1.78	0.048	5.93	0.092
6	−0.56	0.443	5.37	0.132
7	−0.84	0.283	4.53	0.203
8	2.05	0.006	6.57	0.070
9	0.52	0.458	7.10	0.050
10	0.63	0.376	7.73	0.048
11	0.56	0.390	8.29	0.040
12	−0.88	0.133	7.41	0.063
13	0.71	0.261	8.12	0.050
14	0.80	0.196	8.91	0.028
CAR(15,90)			−0.06	0.367

AR measures the abnormal return on day T and CAR (−15,T) measures the cumulative abnormal return for a period that commences 15 days prior to the TASE announcement of dual listing and up to T days around the announcement date (day 0). CAR (15,90) represents the cumulative abnormal return for a period that commences 15 days following the TASE announcement of dual listing and up to 90 days later.
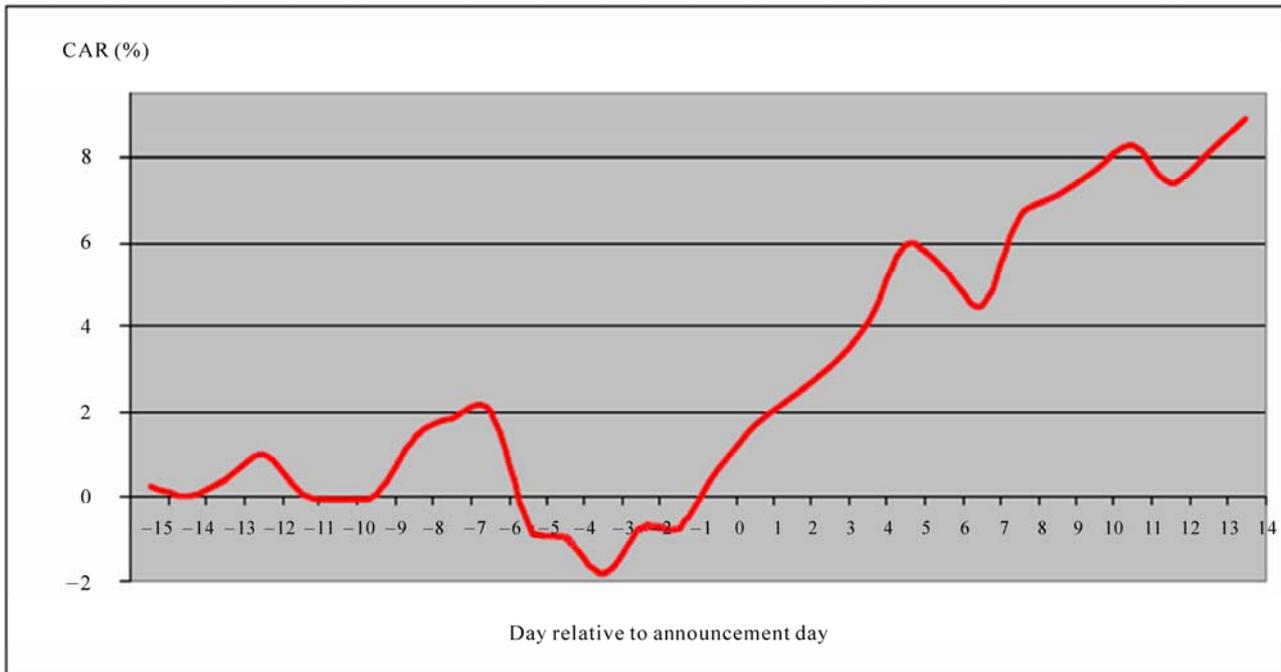
Figure 1. Cumulative abnormal returns (CAR) around the announcement date of dual listing on the TASE.

where d_Volume represents the percentage change of trading volume in both markets. The results show the significant influence that increased liquidity had on share prices following the dual-listing date of announcement. These results are consistent with Merton's claim [7] that broadening the investment base in firm's shares should have a positive effect on their values.

3.4. Market Dominance: Domestic or Foreign

Following Chowdhry and Nanda [18], who argue that the domestic market is the dominant market, we hypothesize that the domestic (TASE) market is the dominant market, in spite of the fact that these are Israeli firms that became public in the foreign market and only then listed their shares in the domestic market.

To investigate the hypothesis we ran the following regressions:

$$R_i = a_0 + a_1 R_{m\_US} + a_2 R_{m\_IS} + a_3 D \cdot R_{m\_US}$$
$$+ a_4 D \cdot R_{m\_IS} + a_5 D + \varepsilon \qquad (2)$$

$$R_i = a_0 + a_1 R_{m\_US} + a_3 D \cdot R_{m\_US} + a_5 D + \varepsilon \qquad (3)$$

$$R_i = a_0 + a_2 R_{m\_IS} + a_4 D \cdot R_{m\_IS} + a_5 D + \varepsilon \qquad (4)$$

where R_i signifies the stock's rate of return in \$US, R_d_m signifies return on the local share index (TA100) and R_f_m foreign market index (composite Nasdaq) rate of return, D is a dummy variable that receives the value of

zero for the period preceding the dual listing, and the value of one for the period following the dual listing. λ_i measures the proportion of share's variance of rate of return explained by the $i = US$ market and that by the Israeli market $i = IS$ where $\lambda_1 = \dfrac{R_{n\_US}^2}{R_{n\_All}^2}$ and

$\lambda_2 = \dfrac{R_{n\_IS}^2}{R_{n\_All}^2}$, $R_{n\_All}^2$ is the R^2 in the first regression, $R_{n\_US}^2$ and $R_{n\_IS}^2$ are the R^2 in second and third regressions, respectively. If λ_1 is significantly greater (smaller) then λ_2, we conclude that the dominant market is the American (Israeli) market.

The results indicate that in all three regressions, share prices are significantly affected by the developments in both the US and Israeli markets. (both a_1 and a_2 are significant in Equation (1)). In only few cases there was a significant change following the dual listing (a_3, a_4 and a_5 in Equation (1)). The main finding is that the US market (the foreign market) is the dominat market of these dual-listed shares. Only in one stock (PTNR) the Israeli market was found to be the dominant market. This finding does does not support the hypothesis that the dominant market is the domestic market. One possible explanation is that the US market is by far a larger, deeper and more liquid market then that of the Israeli market. Another possible explanation is that the IPOs of these firms were in the US and not in the Israeli domestic market.

Table 4. This table examines which of the markets, the US or Israel is the dominant market using the following regression:

$$R_i = a_0 + a_1 R_{m\_US} + a_2 R_{m\_IS} + a_3 D \cdot R_{m\_US} + a_4 D \cdot R_{m\_IS} + a_5 D + \varepsilon \quad R_i = a_0 + a_1 R_{m\_US} + a_3 D \cdot R_{m\_US} + a_5 D + \varepsilon$$

$$R_i = a_0 + a_2 R_{m\_IS} + a_4 D \cdot R_{m\_IS} + a_5 D + \varepsilon .$$

| | Regression Coefficients | | | | | | | λ_i | |
Firm	a_0	a_1	a_2	a_3	a_4	a_5	R^2	I = IS	i=US
MGIC	0.0004	*0.7942	**0.2435	*−0.4823	0.0777	−0.0002	7.90%	0.32	0.87
MTLK	−0.0058	*1.0519	*0.9871	*−0.5514	**−0.4396	0.0061	20.2%	0.54	0.81
SCIX	−0.0000	*0.3407	*0.3456	−0.0579	**0.1882	−0.0001	11.2%	0.65	0.75
TSEM	0.0002	*0.7506	0.1158	*−0.2745	0.6342	−0.0002	15.7%	0.41	0.86
BPHX	−0.0002	*0.5432	*0.2798	*−0.3278	−0.2165	0.0016	6.50%	0.33	0.90
JCDA	−0.0005	*0.5504	**0.2740	**−0.2603	0.0886	−0.0001	5.30%	0.34	0.98
MAGS	0.0009	*0.3203	*0.2816	−0.2129	0.0862	0.0001	2.60%	0.50	0.72
PTNR	**−0.0032	*0.3592	*0.6184	0.0351	0.0662	0.0037	16.3%	0.71	0.64
ALVR	*−0.058	*0.7823	*0.8576	−0.1853	*−0.4444	0.0071	20.5%	0.51	0.77
AUDC	−0.0027	*1.2149	0.4292	**−0.3706	0.0567	0.0025	20.9%	0.30	0.95
CGEN	−0.0013	*0.5301	*0.5531	−0.1090	−0.1158	0.0008	7.70%	0.52	0.80
BOSC	−0.0004	*0.6172	*0.7902	*−0.3507	*−0.2555	−0.0017	9.40%	0.57	0.73
LNOP	0.0023	*1.2628	*0.3794	−0.2880	0.0403	−0.0029	16.1%	0.24	0.92
ORCT	*−0.0023	*0.7188	*0.9332	−0.1658	*−0.6965	*0.0049	12.5%	0.58	0.77
NVMI	−0.0024	*0.6014	*0.4418	−0.2830	−0.2823	0.0022	8.90%	0.38	0.81
MNDO	0.0014	*0.5709	*0.5190	−0.0179	−0.2704	0.0018	6.90%	0.47	0.89
RVSN	−0.0015	*0.6729	*0.7041	*−0.2804	*−0.5038	0.0024	16.2%	0.49	0.76
SPNS	−0.0023	*0.3767	*0.4192	0.1241	**−0.3485	0.0021	4.10%	0.47	0.83
FNDT	−0.0013	*0.4753	*0.3037	−0.1175	−0.0589	0.0014	10.6%	0.39	0.85
GILT	*−0.0058	*0.7371	*0.2818	−0.0865	0.1549	*0.0055	6.50%	0.34	0.94
GIVN	0.0028	*0.4329	0.0730	0.1414	0.1538	*−0.0041	4.80%	0.26	0.93
RDWR	−0.0003	*0.6587	*0.2434	0.0722	−0.1614	−0.0004	12.4%	0.21	0.99
ALDN	0.0018	*0.3029	**0.1870	*0.6687	0.0664	−0.0026	3.70%	0.30	0.93
CRNT	−0.0018	*0.4858	*0.4546	0.0663	−0.2124	−0.0004	7.10%	0.51	0.74
IGLD	0.0020	*0.4980	*0.4023	0.1079	−0.0173	−0.0013	4.30%	0.48	0.68
PRGO	0.0001	*0.6792	0.0707	*0.2829	−0.0310	−0.0002	25.8%	0.09	0.99
TATTF	0.0012	**0.1996	*0.2310	**0.3674	0.0195	0.0007	2.10%	0.54	0.77
CAMT	0.0021	*0.7979	*0.3790	−0.0318	−0.0032	−0.0034	4.40%	0.40	0.78
SILC	0.0032	**0.3919	*0.5264	0.3076	−0.4205	−0.0010	1.90%	0.64	0.51
RDCM	0.0013	*0.6943	*0.4368	0.4318	−0.2384	−0.0031	4.90%	0.41	0.74

where R_i signifies the stock's rate of return in \$US, R_d_m signifies return on the local share index (TA100) and R_f_m foreign market index (composite Nasdaq) rate of return, D is a dummy variable that receives the value of zero for the period preceding the dual listing, and the value of one for the period following the dual listing. λ_i measures the proportion of share's variance of rate of return explained by the $i = S$ market and that by the Israeli market $i = IS$ where $\lambda_1 = \dfrac{R^2_{n\_US}}{R^2_{n\_All}}$ and $\lambda_2 = \dfrac{R^2_{n\_IS}}{R^2_{n\_All}}$, $R^2_{n\_All}$ is the R^2 in the first regression, $R^2_{n\_US}$ and $R^2_{n\_IS}$ are the R^2 in second and third regressions, respectively. If λ_1 is significantly greater (smaller) then λ_2, we conclude that the dominant market is the American (Israeli) market. '*' and '**' represent a clear cut result on the level of 5% and 10%, accordingly.

4. Summary

This paper examines the influence of an amendment to the Securities Law, legislated in 2000, designed to encourage dual listing of Israeli companies, both in Israel and the US, by exempting them from the burden of additional reporting to ISA. The main findings is that the trade volume in shares of the dual listed companies increased by about 123% and that the increased liquidity had a positive effect on share prices, up to 9%, on average. We also find that the trade volume in Israel constitutes about 42% of the overall trade volume in both Israel and the US and that this growth did not affect trade volumes in the US. These findings are consistent with Amihud and Mendelson [17] regarding the effect of liquidity on share prices, and with the model proposed by Merton [7] regarding the broadening of invertors' base and its positive effect on both liquidity and share prices.

The importance of our findings, pertaining to the positive influence on trade volumes and share prices in the absence of registration costs is due, inter alia, to the development of harmonized supervision over the capital markets worldwide, such as the "single passport" in Europe, which significantly reduces the costs of capital raising in various capital markets within the EU.

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