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Price and Demand for Equity Shares in Voucher Privatization in the Cezch Republic

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Abstract:- The Czechoslovak (later Czech) government began the process of privatizing companies. Vouchers were used to privatize substantial portions of the economy during five rounds. The core of these voucher schemes was the use of artificial money (vouchers) to purchase shares of privatized companies. This paper analyzes the relationship between the price and demand of equity shares using econometric modeling package – STATA and TSP. The price of equity shares in the current round and the corresponding individual demand was negative. However, this was not the case only for the second round where derived a positive. This unusual result interpreted in a way that high share prices of the second round could have been a signal in the very beginning to separate more successful companies, which attracted potential investors, therefore, increasing its price even further. This resulted in higher price in the second round lead higher individual demand.

I. INTRODUCTION

In 1991, after the fall of communism, the Czechoslovak (later Czech) government began the process of privatizing companies. Vouchers were used to privatize substantial portions of the economy in several transition countries in Central and Eastern Europe. The core of these voucher schemes was the use of artificial money (vouchers) to purchase shares of privatized companies in several waves of closed auctions, Woo, Parker and Sachs (1997).

Hanousek and Kroch (1998) stated that, voucher privatization took place in two waves. The first wave involved shares in 988 firms. The second included shares in an additional 676 firms plus unsold shares in 185 firms carried over from the first wave. Each wave involved several rounds of bidding. To prevent strategic endgame behavior, the exact number of rounds was not announced until just prior to the final round (round 5 in the first wave and round 6 in the second wave). Share prices were announced by the administrative authorities and participants submitted bids for the number of shares desired at the announced price.

All Czech citizens over the age of 18 were eligible to acquire 1000 voucher points; each unit of demand is 1 coupon that equals 100 points. The money value of 100 points is 100 Czech crowns (CZK). The artificial currency used in the process. Approximately 75 percent of eligible Czechs participated in each wave, making the book value of the shares available slightly more than $1,400 per participant in the first wave and $1,000 in the second wave. The total book value of the equity privatized through vouchers was more than $14 billion, about 10 percent of the Czech Republic's national wealth, Hristova (2002).

Given databases for first wave of Voucher Privatization from the survey of the Ministry of Finance of Czech Republic this paper estimated equations of demand for shares during the first wave of Voucher Privatization scheme. The whole work is aim to analyze the relationship between price and demand for equity share by using spreadsheet and database programs. The estimation of given data has been done using econometric modeling package – STATA and TSP.

II. DATA DESCRIPTION AND PREPARATION FOR ESTIMATION

Initial databases contain data about first wave of privatization from the survey of the Ministry of Finance: firms participating at the voucher privatization, information about their financial state, demand and supply of their shares, bid prices of shares. The survey of the Ministry of Finance has been done across different industries for all districts of Czech Republic. This paper analyzes the first wave of voucher privatization and estimate equations of individual demand for shares. The regression analysis did not take into account the first round since the price of shares in this round was determined by the government. The second and third rounds of the first wave analyzed in TSP and the last two in STATA.

First, missing data deleted: records with sales=0, sales=blank, price (bidding prices) =0, price (bidding prices) =blank dropped. Then, variables such as profit per share (PPS) and debt per unit of capital (DPC) created for the years from 1989 till 1991. The final sample for estimation contains such variables as individual demand during different rounds (demi2,…, demi5), bid price during different rounds (price2,…, price5), net worth (nworth), profit per share for different years (pps89, pps90, pps91), debt per unit of capital for different years (dpc89, dpc90, dpc91), and a dummy variable to account for regional differences for companies from districts Bohemia and Moravia. In particular, 0 attached if a company is from Bohemia and 1 otherwise.

3. Regression Analysis

We analyzed the first wave (rounds 2-5) of voucher privatization. The price equation for the first round was not estimated since the price of shares during the first round was determined by the government. All the models that derived are significant (concluded from high values of F-statistic), Wooldridge (2003). Dummy variable that included accounting regional differences was insignificant during all the rounds.

3.1 Analysis of the First Wave of Privatization (1)

Four rounds (2-5) of the voucher privatization are separately analyzed:

3.1.1 Round 2

Estimated equation:

demi2 = 4953.29 + 71.68*price2 + 0.007*nworth (2)

R2 = 0.58

All the model's estimated coefficients are statistically significant (based on the values of t-statistic), Gegroot (2004). Our regression explains 58% of variation in individual demand for shares in round 2. We see that the relationship between demand and price2 is positive. This is not a standard result. We interpret this result by the nature of voucher privatization process: during second round high share prices could have been a signal to separate more successful companies, which attracted potential investors, therefore, increasing its price even further. This resulted in higher price in the second round lead higher individual demand.

Net worth is something that always mattered. In particular, it remained robust during all the four rounds which we studied. Under robustness we mean that the net worth was significant and stable in terms of a sign during the four rounds: its effect was always significant positive on individual demand. Most probably the effects of dpc91 and pps91 were captured by price2. This means that fluctuations in dpc91 and pps91 could have already been captured by price2. We support our statement by the results given below.

price2 = 29.58 + 57.48*pps91 -2.60*dpc91 (3)

R2=0.26

All the model's estimated coefficients are statistically significant (concluded from the values of t-statistic). Our regression explains 26% of variation.

3.1.2 Round 3

Estimated equation:

demi3 = 3015.48 + 94.13*price2 -40.25*price3 +0.004*nworth (4)

R2=0.38

All the model's estimated coefficients are statistically significant (concluded from the values of t-statistic). Our regression explains 38% of variation in individual demand for shares in round 3. The relationship between current individual demand and current bidding price is negative – a usual result for demand equation. The price of the second round still positively influences individual demand of the current round. We explained this result in a way that price2 captured an initial signal about how a company was successful at the beginning of voucher privatization and as we see this signal still mattered for individual demand for shares in round 3.

3.1.3 Round 4

Estimated equation:

demi4 = 1988.96 + 45.76*price2 -14.81*price4 + 0.002*nworth (5)

R2=0.40

All the model's estimated coefficients are statistically significant (concluded from the values of t-statistic). Our regression explains 40% of variation in individual demand for shares in round 4. The relationship between the price of current round and the corresponding individual demand is negative. As we see price2 still carries the informational effect discussed before.

3.1.4 Round 5

Estimated equation:

demi5 = 1394.96 + 31.46*price2 -12.08*price3 + 0.001*nworth (6)

R2=0.22

All the model's estimated coefficients are statistically significant (concluded from the values of t-statistic). Our regression explains 22% of variation in individual demand for shares in round 5. Price2 still carries the informational effect discussed earlier. We included also the price of the third round; the relationship is negative. Relatively low explanatory power of the equation for this last round of the first wave of voucher privatization and insignificance of the price of the current round could possibly be explained by the government's announcement that this round was the last one.

III. CONCLUSION

This paper analyzed the process of estimated demand equations for the 2-5 rounds of the first wave of voucher privatization in Czech Republic and received the following results:

(i) The price equation for the first round of the first wave was not estimated since the price of shares during the first round was determined by the government. Explanatory variables as profit per share and debt per unit of capital did not appear in the model because, as we derived, their effects were captured by the price of second round, which was significant during all subsequent rounds of the first wave of voucher privatization.

(ii) The relationship between the price of a current round and the corresponding individual demand is negative. However, this was not the case only for the second round where we derived a positive. This unusual result we have interpreted in a way that high share prices of the second round could have been a signal in the very beginning to separate more successful companies, which attracted potential investors, therefore, increasing its price even further. This resulted in higher price in the second round lead higher individual demand.

(iii) The last fifth round of the first wave of voucher privatization also has an unusual feature: price of this round was insignificant for the individual demand for shares. This fact could possibly be explained by the government's announcement that this round was the last one.

(iiii) All the models that derived were significant (concluded from high values of F-statistic). Dummy variable that included for accounting regional differences was insignificant during all the rounds. The net worth was significant and stable in terms of a sign during the four rounds (2-5): its effect was always significant and positive on individual demand for shares.

REFERENCES

[1]. DEGROOT, M. Optimal Statistical Decisions. Mellon University, John Wiley & Sons, INC Publication, 2004.

[2]. HANOUSEK, J., KROCH, E. The Two Waves of Voucher Privatization in Czech Republic: A Model of Learning in Sequential Bidding. Applied Economics, Volume 30, January 1998, p. 133 – 143.

[3]. HRISTOVA, K. Czech Voucher Privatization: A Case of Decision Making Under Uncertainty, Undergraduate Journal of Economics, 2002. P. 1-6.

[4]. MINISTRY of FINANCE, Non-Commercial use 1992: http://www.mfcr.cz/scripts/hpe/default.asp

[5]. WOO, W., PARKE, S., SACHS, J. Economies in Transition: Comparing Asia and Eastern Europe. Massachusetts institute of technology, MIT press, 1997.

[6]. Wooldridge, J. Introductory Econometrics: A Modern Approach. 2nd Ed, Thomson, South- Westeren, 2003.

Appendix

Table: 1 codes for different districts in Czech Republic used in the data

District codes	District codes

3101	Praha 1	3504	Jablonec n.Nisou
3102	Praha 2	3505	Liberec
3103	Praha 3	3506	Litomerice
3104	Praha 4	3507	Louny
3105	Praha 5	3508	Most
3106	Praha 6	3509	Teplice
3107	Praha 7	3510	Usti nad Labem
3108	Praha 8	3601	Havlickuv Brod
3109	Praha 9	3602	Hradec Kralove
3110	Praha 10	3603	Chrudim
3201	Benesov	3604	Jicin
3202	Beroun	3605	Nachod
3203	Kladno	3606	Pardubice
3204	Kolin	3607	Rychnov nad Kneznou
3205	Kutna Hora	3608	Semily
3206	Melnik	3609	Svitavy
3207	Mlada Boleslav	3610	Trutnov
3208	Nymburk	3611	Usti nad Orlici
3209	Praha-vychod	3701	Blansko
3210	Praha-zapad	3702	Brno-mesto
3211	Pribram	3703	Brno-venkov
3212	Rakovnik	3704	Breclav
3301	Ceské Budejovice	3705	Zlin
3302	Cesky Krumlov	3706	Hodonin
3303	Jindrichuv Hradec	3707	Jihlava
3304	Pelhrimov	3708	Kromeriz
3305	Pisek	3709	Prostejov
3306	Prachatice	3710	Trebic
3307	Strakonice	3711	Uherske Hradiste
3308	Tabor	3712	Vyskov
3401	Domazlice	3713	Znojmo
3402	Cheb	3714	Zdar nad Sazavou
3403	Karlovy Vary	3801	Bruntal
3404	Klatovy	3802	Frydek-Mistek
3405	Plzen-mesto	3803	Karvina
3406	Plzen-jih	3804	Novy Jicin
3407	Plzen-sever	3805	Olomouc
3408	Rokycany	3806	Opava
3409	Sokolov	3807	Ostrava-mesto
3410	Tachov	3808	Prerov
3501	Ceska Lipa	3809	Sumperk
3502	Decin	Vsetin	
3503	Chomutov		

Table: 2 codes for industries in Czech Republic used in the data

Czech Industry Codes	Czech Industry Codes

Agriculture, forestry, and fishing 11 agriculture 12 forestry 13 fishing and fisheries Heavy industry and mining 21 fuel and refining 22 primary energy 23 iron and steel 24 nonferrous metals 25 chemical and rubber 26 machine tools 27 electrical and electronics 28 building materials 29 timber industry Light industry 30 specialty metal 31 pulp and paper 32 glassware and porcelain 33 textiles 34 clothing and accessories 35 leather goods and tanning 36 print materials and printing 37 food industry 38 frozen foods and spring water 39 other industrial materials Construction 41 construction 43 site analysis and preparation 45 construction design Transportation and telecommunication 51 transportation 53 post and telecommunications Trade	61 internal trade 62 foreign trade 63 general distribution 64 distribution of agricultural products 66 publishing 69 other commerce 7. Research and development 71 agriculture and forestry R&D 72 basic industry R&D 73 light industry R&D 74 construction R&D 75 transportation and communications R&D 76 trade R&D 77 basic science 78 services and trade R&D 79 services for R&D Services, culture, and education 81 apartment and housing 82 hotels and accommodations 83 travel services 84 municipal services 85 schooling 86 cultural services 87 health care 88 social care Finance and state institutions 91 trade and technical services 92 banks and banking 93 insurance 95 legal administration, justice and prosecution 96 defense and security services 97 business consulting

Attachments:

```
      PROGRAM
COMMAND  ********************************************************************
1  Read (file='datatsp.xls')
nworth, pps91, dpc91, price2, demi2, price3, demi3;
2
2
2  OLSQ demi2, c, price2, nworth;
3
3  OLSQ price2, c, pps91, dpc91;
4
4  OLSQ demi3, c, price2, price3, nworth;
5
5  END;
      EXECUTION
************************************************************************
Current sample:  1 to 657

                    Equation   1
                    ============
```

```
              Method of estimation = Ordinary Least Squares
Dependent variable: DEMI2
Current sample:  1 to 657
Number of observations:  657

      Mean of dep. var. = 10994.8              LM het. test = .186841 [.666]
  Std. dev. of dep. var. = 21612.1             Durbin-Watson = 2.02267 [<.648]
Sum of squared residuals = .129437E+12         Jarque-Bera test = 34532.4 [.000]
   Variance of residuals = .197915E+09         Ramsey's RESET2 = 17.6392 [.000]
Std. error of regression = 14068.2             F (zero slopes) = 447.086 [.000]
          R-squared = .577567                  Schwarz B.I.C. = 7215.92
     Adjusted R-squared = .576275              Log likelihood = -7206.19

         Estimated    Standard
Variable Coefficient     Error      t-statistic   P-value
C         4953.29       713.090       6.94623       [.000]
PRICE2    71.6812       10.9112       6.56952       [.000]
NWORTH    .687923E-02   .233660E-03   29.4412       [.000]

                          Equation   2
                          ============
              Method of estimation = Ordinary Least Squares
Dependent variable: PRICE2
Current sample:  1 to 657
Number of observations:  657

      Mean of dep. var. = 40.0950          LM het. test = 26.4014 [.000]
  Std. dev. of dep. var. = 50.3926         Durbin-Watson = 1.84283 [<.027]
Sum of squared residuals = .123453E+07  Jarque-Bera test = 5883.37 [.000]
   Variance of residuals = 1887.66       Ramsey's RESET2 = 49.5248 [.000]
Std. error of regression = 43.4472       F (zero slopes) = 114.250 [.000]
          R-squared = .258924          Schwarz B.I.C. = 3418.38
     Adjusted R-squared = .256658         Log likelihood = -3408.64

         Estimated    Standard
Variable  Coefficient     Error      t-statistic   P-value
C         29.5760       1.92698       15.3483       [.000]
PPS91     57.4835       3.80617       15.1027       [.000]
DPC91     -2.60055      1.16747       -2.22751      [.026]

                          Equation   3
                          ============
              Method of estimation = Ordinary Least Squares
Dependent variable: DEMI3
Current sample:  1 to 657
Number of observations:  657
        Mean of dep. var. = 6232.26                LM het. test = 13.2304 [.000]
    Std. dev. of dep. var. = 14914.7               Durbin-Watson = 1.68102 [<.000]
Sum of squared residuals = .898655E+11         Jarque-Bera test = 179747. [.000]
     Variance of residuals = .137619E+09       Ramsey's RESET2 = 219.709 [.000]
  Std. error of regression = 11731.1             F (zero slopes) = 135.785 [.000]
            R-squared = .384169                  Schwarz B.I.C. = 7099.30
     Adjusted R-squared = .381339                Log likelihood = -7086.33

         Estimated    Standard
Variable  Coefficient     Error      t-statistic   P-value
C         3015.48       594.728       5.07035       [.000]
PRICE2    94.1253       15.7637       5.97102       [.000]
PRICE3    -40.2469      8.83834       -4.55367      [.000]
```

```
NWORTH    .376558E-02   .194893E-03   19.3213       [.000]
*******************************************************************************
  MEMORY USAGE:    ITEM:    DATA ARRAY  TOTAL MEMORY
                   UNITS:  (4-BYTE WORDS) (MEGABYTES)
  MEMORY ALLOCATED        :  500000      4.0
  MEMORY ACTUALLY REQUIRED :   22192      2.2
  CURRENT VARIABLE STORAGE :    6296
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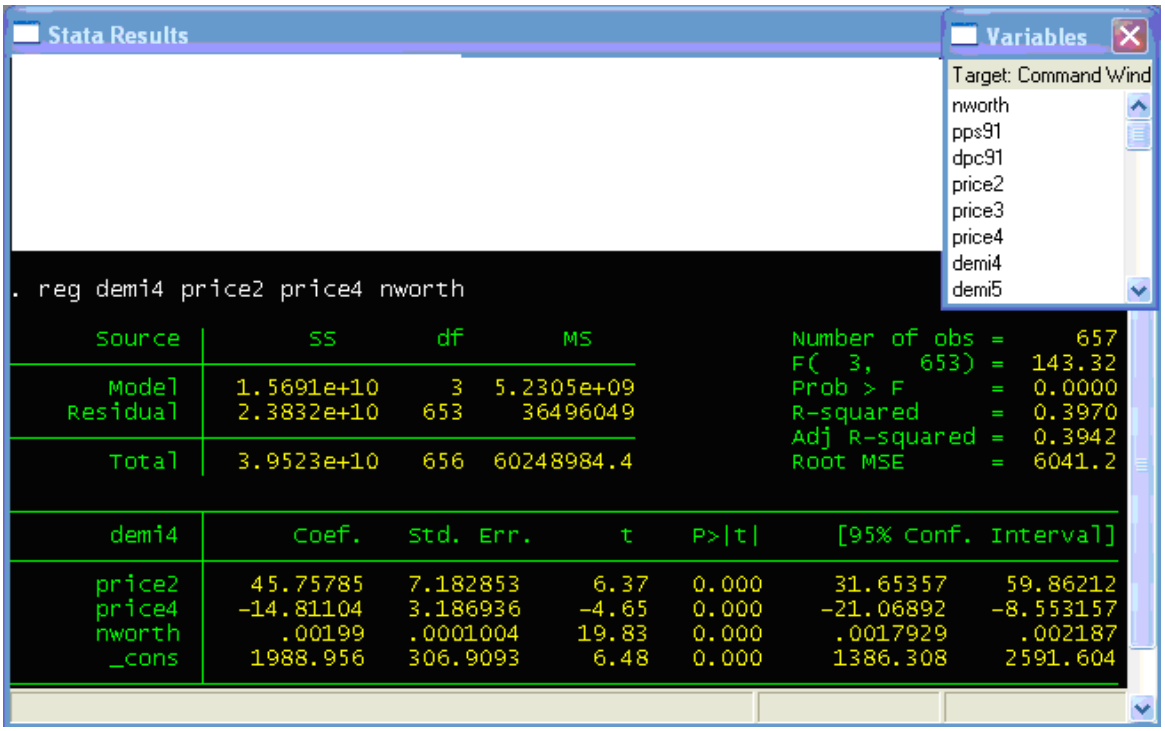

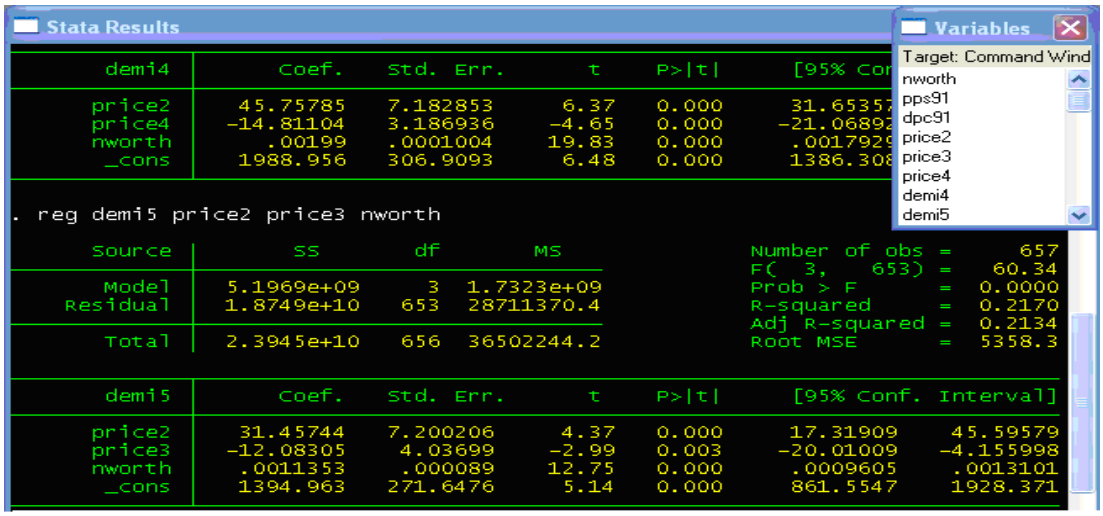

END OF OUTPUT