

## The Evolution of Italian Stock Market in the Last Decay

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### Objectives of the project

The project wants to discover the main correlations among a set of financial variables.

We have considered two main steps: an interest rate part analysis and an aggregate part.

We have taken into consideration a short and a long run horizon.

The main results are summarised in the following steps.

**Main point:** Many credit contracts are indexed to 3m interest rate. Short run rates are important indexes of money market and long run rates are indicative for bond market.

### Deposits

The best regressions discovered are the following ones:

Regression	R2	Durbin Watson
$Tdep=c+\alpha tdep(t-1)+\beta tdep(t-2)+\delta eur1m+\eta eur1m(t-1)+\varepsilon$	0.99702 1	2.166318
$Tdep=c+\alpha tdep(t-1)+\beta tdep(t-2)+\delta eur1m+\varepsilon$	0.99674 4	1.724554

From a qualitative point of view the main conclusions are the following ones:

- Important role of refi and eur1m in explaining the behaviour of tdep;
- Tdep and tdep(-1) behave in the same way;
- Interesting role of the transformed variable (timp(t-1)-tdep(t-1));
- Growing the number of lags of eur1m, the quality of estimation increases;
- Refi seems to be a dummy variable;

**Main point:** Eur1m incorporates the expectations on money markets: euribor represents an interbank interest rate, while refi rate constitutes a refinancing rate, which is controlled by the European Central Bank.

### Long run Loans (Mortgages: not another form of financing)

The best regressions discovered are the following ones:

Regression	R2	Durbin Watson
$Timpml=c+\alpha eur3m+\beta btp10y+\delta timpml(t-1)+\varepsilon$	0.99822 3	1.855851
$Timpml=c+\alpha timp(t-1)+\beta \Delta eur3m+\delta btp10Y+\varepsilon$	0.99785 6	1.609741
$Timpml=c+\alpha timpml(t-1)+\beta eur3m+\delta btp10Y+\gamma (timpml(t-1)-tobb(t-1))+\varepsilon$	0.99829 9	1.710667

From a qualitative point of view the main conclusions are the following ones:

- Important role of timpml(-1) in explaining timpml;
- Take into consideration the role of the transformed variable  $\Delta eur3m$ ;

- The choice of the variable BTP10Y is important in explaining the behaviour of the long run money market curve;
- The variable  $(timpml(-1)-tobbl(-1))$  represents the drive of the price policies of the banks;
- The variation of the money market interest rate is significant because it incorporates the expectations. This fact influences the financing prices;

### Families

The best regressions discovered are the following ones:

Regression	R2	Durbin Watson
$Timpmlfam=c+\alpha timpmlfam(t-1)+\beta eur3m+\delta eur3m(t-1)+\gamma btp10Y(t-1)+\lambda tobbl+\epsilon$	0.991056	2.318300
$Timpmlfam=c+\alpha timpmlfam(t-1)+\beta eur3m+\delta eur3m(t-1)+\gamma btp10Y(t-1)+\lambda (timpml(t-1)-tobbl(t-1))+\epsilon$	0.991051	2.313167

From a qualitative point of view the main conclusions are the following ones:

- There is a correlation between the variables  $timpmlfam$  and  $timpmlfam(-1)$ ;
- Improving the number of lags of  $eur3m$ , the quality of estimation is quite better;
- The main explicative variables for  $timpmlfam$  are  $timpmlfam(-1)$ ,  $eur3m$ ,  $btp10y$ ;
- The choice of  $tobbl$  is determinant for explaining the behaviour the investment preferences of families;

### Enterprises

The best regressions discovered are the following ones:

Regression	R2	Durbin Watson
$Timp.imprese=c+\alpha timpimp(t-1)+\beta eur3m+\delta eur3m(t-1)+\gamma btp10Y(t-1)+\lambda btp10Y(t-2)+\epsilon$	0.972778	2.486407
$Timp.imprese=c+\alpha timpimp(t-1)+\beta eur3m+\gamma btp10Y(t-1)+\epsilon$	0.970452	2.508611
$Timp.imprese=c+\alpha timpimp(t-1)+\beta eur3m+(timpml(t-1)-tobbl(t-1))+\gamma btp10Y(t-1)+\epsilon$	0.974133	2.261366

From a qualitative point of view the main conclusions are the following ones:

- There is a correlation between the variables  $timpmlfirms$  and  $timpmlfirms(-1)$ ;
- Improving the number of lags of  $eur3m$ , the quality of estimation is quite better;
- Main explicative variables are  $eur3m$ ,  $btp10Y$ ;

### Debt securities

The best regressions discovered are the following ones:

Regression	R2	Durbin Watson
$Tobbl=c+\alpha tobbl(t-1)+\beta eur3m+\gamma btp10Y+\lambda(tbtp10Y-tobbl)(t-1)+\varepsilon$	0.998979	1.700482
$Tobbl=c+\alpha tobbl(t-1)+\beta eur3m(t-1)+\lambda btp10Y(t-1)+\gamma(timpml-tobbl)(t-1)+\varepsilon$	0.998905	1.559474

From a qualitative point of view the main conclusions are the following ones:

- Explicative role of the transformed variable  $(tbtp10Y-tobbl)(-1)$ ;
- $(timp-tdep)(-1)$  is more explicative than  $(tbtp10Y-tobbl)(-1)$  in explaining the prices of the mortgages;
- The prices of financing are more relevant than the prices of funding;

**Main point:** The money market movements are more relevant than the bond market ones. The variable interest rate is more linked with short run rates (this depends on money market). The fixed interest rate is more linked with long run rate (this depends on bond market).

#### *Aggregate part analysis-Main conclusions*

The analysis has been organized in different steps. The main variables considered are current accounts, deposits (bank and saving), debt securities and repurchase agreements.

#### *C/C levels analysis*

For the analysis of the cc levels we have considered an historical sample coming from 1997. The best regressions we have computed are defined by the following equations:

$$\log clevel = c + \alpha \log clevel(-1) + \beta btp10y + \gamma assicc(-1) + \delta \log 2 + \varepsilon$$

$$\log clevel = c + \alpha \log clevel(-1) + \beta btp10y + \gamma assicc(-1) + \delta \log 3 + \varepsilon$$

$$\log clevel = c + \alpha \log clevel(-1) + \beta btp10y + \gamma \log 2 + \delta assicc + \varepsilon$$

The notation  $\delta \log 1$  is equal to  $\log(gdp)-\log(gdp(-1))$ .

The notation  $\delta \log 2$  is equal to  $\log(gdp)-\log(gdp(-2))$ .

The notation  $\delta \log 3$  is equal to  $\log(gdp)-\log(gdp(-3))$ .

The first regression is defined by an  $R(2)=0.995496$  and  $DW=2.097929$ .

The second regression is defined by an  $R(2)=0.995089$  and  $DW=2.085070$ .

The third regression presents an  $R(2)=0.995367$  and  $DW=2.073907$ .

From the analysis of the test results and from the evaluation of the coefficients, we can deduce the following main qualitative results for  $\log clevel$ :

-Positive relation with  $\log clevel(-1)$ : The increase in the level of deposits at  $t=-1$  leads to an increase in the level of deposits at  $t=0$ ;

-Positive relation with  $\Delta \log 1$ : There is an ambiguous effect on  $\log c$  levels. In some cases the coefficient is positive and in other cases it is negative;

-Negative relation with  $\text{tassicc}(-1)$ : An increase in the level of deposits at  $t=-1$  leads to a decrease of the level of deposits at  $t=0$ . This effect can seem not coherent. We should take into consideration the role of the spread between  $cc$  interest rates and long term securities ones.

-Negative relation with  $\Delta \text{tassi}$ : An increase in the long term securities interest rates induce people to invest in long term securities.

-Positive correlation with GDP level: An increase in the level of wealth means more money in portfolio of investors.

### *Saving deposits analysis*

For the analysis of saving deposits we have considered a sample of values coming from January 1997 to June 2003. The main results we have arrived are the following ones:

- The level of saving deposits is a little sensible to  $c$  level;
- The level of saving deposits is a little sensible to  $\log GDP$  level;
- The level of saving deposits is a little sensible to  $\text{tassi } cc$  behaviour.

The best regression presents the following results:

- The value of  $R^2$  is equal to 0.995387;
- The value of Durbin-Watson statistic is equal to 2.062883.

We have considered also the graph of the residual plot. For January we have considered there is a seasonality of residual behaviour. To reduce this effect we have considered a dummy variable *@trend* which has an increasing behaviour.

With this instrument the seasonality of the variable has diminished.

From this analysis we can deduce that saving deposits represent not an interesting form of investment for investors.

### *Bond part analysis*

For the bond part analysis we made some regressions for investigating the correlations among  $\log \text{levelobbl}$  and some variables like  $\log \text{levelobbl}(-1)$ ,  $\text{euribor3month}$  and  $\text{btp10y}$ .

The best regressions we discovered present the following shapes:

$$\Delta \log \text{obbl} = c - \alpha \log \text{levelobbl}(-1) + \beta \Delta \log \text{obbl}(-1) - \gamma \Delta \text{eur3} + \delta \text{btp10y} + \varepsilon$$

$$\log \text{levelobbl} = c + \alpha \log \text{levelobbl}(-1) + \beta \log \text{levelobbl}(-2) - \gamma \Delta \text{eur3} + \delta \text{btp10y} + \varepsilon$$

The first regression present an  $R^2$  equal to 0.485003 and a Durbin Watson statistic equal to 2.105209.

The second regression present an  $R^2$  equal to 0.998536 and a Durbin Watson statistic equal to 2.105209.

We can show the following conclusions:

- There is a positive correlation among  $\log \text{levelobbl}$  and its lags;

- There is a negative correlation among  $\log \text{levelobbl}$  and  $\text{deltaeur3}$ . The alternative short term investments represent a competitive financial instrument with respect to bank bonds.
  - There is a positive correlation among  $\log \text{levelobbl}$  and  $\text{btp10y}$ . If there is an increment of the interest rate of government bonds, people propensity to invest in bank bonds increases.
  - The elasticity of BTP versus  $\text{deltalgobbl}$  is equal to 0.3%;
  - The elasticity of  $\text{deltaeur3}$  versus  $\text{deltalgobbl}$  is equal to  $-0.4\%$ ;
- Also the analysis of  $\text{levelobbl}$  shows that obligation level has grown in the last five years.  
Bonds still represent an interesting form of investment for investors.

### *Repos Analysis*

For the repos part analysis we made some regressions for investigating the correlations among  $\log \text{plevel}$  and some variables like  $\log \text{plevel}(-1)$ ,  $\text{deltabot3month}$  and  $\text{btp10y}$ .

The best regressions we discovered present the following shapes:

$$\log \text{plevel} = c + \alpha \log \text{plevel}(-1) + \beta \text{deltabot3m} + \delta \text{btp10y} + \varepsilon$$

$$\log \text{plevel} = c + \alpha \log \text{plevel}(-1) + \beta \text{bot3m}(-1) + \gamma \text{deltabot3m} + \delta \text{btp10y} + \varepsilon$$

The first regression presents an  $R^2$  equal to 0.871437 and a Durbin Watson statistic equal to 2.519173.

The second regression presents an  $R^2$  equal to 0.872373 and a Durbin Watson statistic equal to 2.511411.

We can show the following conclusions:

- $\log \text{plevel}(-1)$  has a stabilization position;
- Repos are liquid financial instruments. The relevant interest rate to be considered is  $\text{bot3m}$ ;
- $\text{BTP10y}$  is a long run interest rate. There is a positive correlation with  $\log \text{plevel}$ .
- The role of  $\text{deltabot3m}$  is also important. There is a positive correlation between  $\log \text{plevel}$  and this type of spread.

Repos still represent an interesting form of investment. They are especially used by investors for liquidity objectives.