Where the dirty surplus accounting flows are?

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Abstract

Purpose – The purpose of this paper is to locate the specific items from the financial statements that are responsible for the dirty surplus accounting flows and how important they are in its explanation.
Design/methodology/approach – It is generally accepted that some country accounting rules allow some operations that can generate dirty surplus in the annual statements. Working on this basis, it is necessary to consider information at the same time across firms and across time, using panel data econometric techniques. A static panel data estimated by generalized least squares can be used to correct correlations between firms and account numbers or a dynamic panel data estimated by GMM-SYS with instrumental variables to avoid endogeneity.
Findings – Results show that in a static panel data model, the income statement items have a lower explicative power of balance sheet items variations, having higher explicative power a dynamic one (AR(1)). Results show that, specifically, financial assets, debts and book value capture the dirty accounting flows.
Research limitations/ implications – Working in differences reduces the explicative power of the income statement and working in levels could be inconsistent if it is impossible to contrast, first, stationary in data due to their shortage. It is suggested that future works increase the frequency of the observed data, and contrast the cointegration as a way to check the accounting relationships.
Practical implications – It is important to evaluate whether the income statement can (or cannot) explain the financial position of a firm. Also it is important to know where dirty surplus accounting flows are located can be useful for firms' valuation.
Originality/value – The econometric technique proposed in the paper deals with the main limitation in accounting research: information is bigger in cross-section (number of firms) than in time series (economic periods).

Keywords Accounting, Income, Financial reporting, Surpluses

Paper type Research paper

1. Introduction

One of the fundamental objectives of firms' financial information is to serve on the decision-making processes. In this sense, studies about the estimation of the intrinsic value of firms from residual income models stand out, from research of Preinreich (1936) and Edwards and Bell (1961) to Ohlson (1995) and Felthman and Ohlson (1995). In general, since Peasnell (1981, 1982) showed that any accounting measure of income can be discounted to match the firm's value given by discounting free cash flows, both for the valuation and the empirical analysis on the basis of accounting information, to assume clean surplus or dirty surplus has been the starting point hypothesis.

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Both hypotheses presume that income statement is the nexus between a current equity value and the equity value in the next period, which is measured from the balance sheet. But, while clean surplus relation (CSR) assumes that this nexus is unique and truthful, dirty surplus claims that other relations that are not registered on income statements exist. In addition to this difference, when both hypotheses are implemented in empirical works, some other large differences arise, due to their own applications, which are related to the operative or financial typology of accounting items. That is, while a clean relation takes into account only operative and financial items of the income statement, a dirty relation adds extraordinary items to them.

As Isidro *et al.* (2004, 2006) have pointed out, the issue of whether dirty surplus accounting practice should be restricted has been a subject of debate for decades. But, while these authors analyse dirty surplus from a market valuation purpose, we contrast which balance sheet items record the dirty surplus flows. On doing it, we will be able to evaluate whether the income statement can (or cannot) explain the financial position of a firm. It is generally accepted that some country accounting rules allow some operations that can generate dirty surplus in the annual statements. Working on this base, the main goal of our paper is to locate the specific items from the statements that are responsible for this dirty surplus and how important they are in its explanation. Even more, we explore the possibility that this characteristic of our accounting information could affect the correct valuation of the firms.

As this objective is time dependent, it is necessary to consider it at the same time across firms and across time, using panel data econometric techniques. Working with this methodology we avoid the scale effect, as we can capture the idiosyncratic characteristics of each firm. More exactly, we can use a static panel data estimated by (generalized least squared (GLS), within-between) to correct correlations between firms and account numbers or a dynamic panel data estimated by GMM-SYS with instrumental variables to avoid endogeneity.

The choice depends on the results of contrasting unit roots in account numbers. The sample used to contrast the model is a panel data including 4,595 large Spanish firms, under EU definition, from 1994 to 2004 inclusive. The Spanish accounting norm during this sample period demanded that expenses and revenues in the income statement be grouped into three categories: operative, financial and extraordinary. The first are directly related to the activity of the firm, such as sales, purchases and salaries. Financial expenses, however, are related to the financial debt of the firm, while financial revenues are linked with investments of a financial character. Finally, the extraordinary group includes atypical results and results not related to the main activity of the firm or derived from its finance. Examples of this last group are: the depreciation of non-financial fixed assets; results due to the sale of such assets; and the recognition of capital grants as revenue. In this way, the choice of this sample seeks to contrast if the aforementioned division of the income statement is really a means of separating clean surplus operations from dirty surplus operations.

The paper is organized as follows: we analyse the general model in the next section; the methodology to contrast it using panel data (static and dynamic) is shown in the third section, sample description and results are offered in the fourth section, and in the fifth we summarize and conclude the study.

2. The model

According to Peasnell (1981), book value of equity changes with the earnings generated in the period, once net cash payments (dividends) are deducted. From a balance sheet and an income statement, if bv_t is the book value of equity at date t, x_t, denotes earnings in period ending at date t and D_t are dividends (net cash payments) received at the end of period t, then the CSR shows that:

$$bv_t = bv_{t-1} + x_t - D_t \tag{1}$$

When expression (1) is implemented, some relevant issues arise:

- *Condition I.* Net dividend adds both the portion of income from last period that are paid to shareholders depending on pay-out ratio (p), and any other operation of capital (K), as, for instance, increases or decreases of capital.
- *Condition II.* The net income for the period represents operating expenses and revenues and financial expenses, as financial assets are market valued (since changes in their value are not reflected in the income statement) (Felthman and Ohlson, 1995; Penman and Sougiannis, 1998; Lo and Lys, 2000; and Ota, 2002). It is necessary to remember that clean relation takes into account only operative and financial items of the income statement, while a dirty relation adds extraordinary items to them.

It means that extraordinary earnings and financial revenues do not explain changes in assets and liabilities, revaluations in non-financial assets do not occur, depreciation in assets explain perfectly fixed assets value behaviour, book value of equity is independent of firm tax policy, etc.

Focusing now on the balance sheet, the next identity is observed:

$$\text{Asset}_t + \text{Finance}_t + \text{WC}_t \equiv bv_t + +\text{Debt}_t \tag{2}$$

where Asset adds tangible and intangible fixed assets, Finance financial assets, WC is the working capital, i.e. the difference between non-financial current assets and current liabilities, and Debt short- and long-term financial debts. Adding together expressions (1) and (2) we obtain:

$$\text{Book}_t = bv_t = bv_{t-1} + x_t - D_t = \text{Asset}_t + \text{Finance}_t + \text{WC}_t - \text{Debt}_t \tag{3}$$

The fundamental hypothesis of CSR is inferred from expression (3). It means that end-of-period book value equals beginning-of-period book value plus the period's earnings minus dividends. In other words, all changes in assets and liabilities that are not related to dividends must be reflected in the income statement, specifically through interests and operating earnings, since financial assets are market valued.

In accounting, end-of-period value of any item is the result of adding beginning-of-period value plus variations in that period. Accordingly, if CSR is working, those variations are reflected in the income statement, and we could express that as:

$$Y_t = Y_{t-1} + \Delta Y_{t-1,t} - \nabla Y_{t-1,t} = Y_{t-1} + \sum_k Z_{k,t} \tag{4}$$

where Y is any patrimonial item in expression (4) and Z each item in income statement.

However, if we suppose that the above conditions are not proved, expression (4) can be changed into:

$$\begin{aligned} Y_t = Y_{t-1} &+ [(\mathrm{Inc}_t + \mathrm{Otinc}_t) - (\mathrm{Exp}_t + \mathrm{Empl}_t)] \\ &+ [\mathrm{IF} - \mathrm{Int}_t] + [\mathrm{Ix}_t - \mathrm{Ex}_t] - \mathrm{Tax} - [p_t \cdot x_{t-1} + K_t] \end{aligned} \tag{5}$$

where Inc are net operating revenues, Otinc are non-operating revenues, Exp operating expenses other than salaries, Empl salaries, IF financial revenues, Int financial expenses, Ix extraordinary[1] incomes, Ex extraordinary expenses, Tax taxes for the period[2] and K represents the rest of variations that are not explained by the income statement, i.e. has a positive value for decreases of capital and negative value for increases of capital.

However, two possibilities exist in order to contrast expression (5). On the one hand, working on differences, as follows:

$$\begin{aligned} \Delta Y_t = a_0 &+ a_1 \cdot \mathrm{Inc}_t + a_2 \cdot \mathrm{Otinc}_t + a_3 \cdot \mathrm{Exp}_t \\ &+ a_4 \cdot \mathrm{Empl}_t + a_5 \cdot \mathrm{IF} + a_6 \cdot \mathrm{Int}_t + a_7 \cdot \mathrm{Ix}_t \\ &+ a_8 \cdot \mathrm{Ex}_t + a_9 \cdot \mathrm{Tax}_t + a_{10} \cdot x_{t-1} + u_t \end{aligned} \tag{6}$$

where a_0 shows the average of changes in balance sheet items that are not explained by income statement items, and depends on K (see Equation (5)), and u_t is the residual of this model.

On the other hand, working with a dynamic expression as:

$$\begin{aligned} Y_t = b_0 &+ \rho \cdot Y_{t-1} + b_1 \cdot \mathrm{Inc}_t + b_2 \cdot \mathrm{Otinc}_t + b_3 \cdot \mathrm{Exp}_t \\ &+ b_4 \cdot \mathrm{Empl}_t + b_5 \cdot \mathrm{IF} + b_6 \cdot \mathrm{Int}_t + b_7 \cdot \mathrm{Ix}_t \\ &+ b_8 \cdot \mathrm{Ex}_t + b_9 \cdot \mathrm{Tax}_t + b_{10} \cdot x_{t-1} + e_t \end{aligned} \tag{7}$$

It must be pointed out that b_0 represent the mean value of each balance sheet items, so it is not related with K, as it is recorded by the residual b_t.

The expected parameter values in both models, except Book, are 1 (revenues) or -1 (expenses) for assets (Asset, Finance, and WC), and with opposite signs for liabilities (Debt), since net earnings result from adding revenues minus expenses. The exception corresponds to x_{t-1} parameter, since it depends on pay-out. The expected value for book value is less than 1, as it is affected by pay-out or dividend policy, i.e. only in the case that total earnings are paid as dividends, those parameters could be next to 1. The choice between both options depends on the behaviour of variables, i.e. expression (7) implies that Y is stationary, while expression (6) assumes the contrary.

3. Econometric methodology

The objective of this methodology is to check, for a pool of firms, which of the account items reflect the dirty surplus accounting flows, and their relative significance in explaining them. Due the fact that some accounting rules generate dirty surplus accounting flows, we explore, as well the possibility that valuation could be affected by this fact.

The firms considered in this paper are chosen not independently but in a specific economic context that allow us to analyse all relationships between them. Moreover, they are chosen along time, as studies in a particular moment can not be generalized for any time and space. The problem above can be treated in two ways, depending on whether variations in patrimonial items are considered (Equation (6)), or we work with first-order autoregressive models (Equation (7)). And that will depend on the results of testing the unit roots of the series first.

One of the main difficulty in the analysis of accounting data is the impossibility of using time series techniques due to shortage of data, as in most of the cases the observations for a firm are restricted to one per economic period. That is the reason why most of the empirical works on accounting data use cross-section techniques, although it means losing the time perspective. For all this, we propose to exploit all available information, which is bigger in cross-section (large number of firms) than in time series (short number of economic periods by firm) using panel data (Arellano, 2003). It should be taken into account that this methodology avoid the cross section problems and can capture the idiosyncratic characteristics of firms, as we subtract the mean in the estimations, avoiding as well the scale effect.

The panel will be a balanced one if data is available for the all considered periods and for the whole set of firms. Otherwise, it will be an unbalanced panel. The estimation methods will be different in each case, since the lagged explicative variable is not included in the regressors in the first case, i.e. it is a static panel, as happens in the second case, and so we would have a dynamic panel. (see Appendices 1 and 2 for unit root tests over panel data).

Once the contrasts have been implemented, and in the case that the null is accepted (no stationarity) we should work with expression (Equation (6)), i.e. we have a static panel data as:

$$\begin{bmatrix} \Delta\mathbf{Y}_{1,t} \\ \vdots \\ \Delta\mathbf{Y}_{k,t} \end{bmatrix} = \mathbf{A}_0 \begin{bmatrix} \mathbf{X}_{1,t} & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & \mathbf{X}_{1,t} \end{bmatrix} \cdot \begin{bmatrix} \mathbf{A}_1 \\ \vdots \\ \mathbf{A}_k \end{bmatrix} + \begin{bmatrix} \mathbf{U}_{1,t} \\ \vdots \\ \mathbf{U}_{k,t} \end{bmatrix} \tag{8}$$

while if the null is rejected, we should work with:

$$\mathbf{Y}_{j,t} = \mathbf{B}_0 + [\,\mathbf{Y}_{j,t-1} \quad \mathbf{X}_{j,t}\,] \cdot \begin{bmatrix} \rho_j \\ \mathbf{B}_j \end{bmatrix} + e_{j,t}$$
$$j = 1, \ldots, k \tag{9}$$

where j is the indicator for each patrimonial item.

Since in both cases, we are working with a pool of firms along different years, that is, a panel data, the above expressions can be change into the next ones for Asset, Finance, WC, and Debt.

$$\mathbf{Y}_{j,t} = \begin{bmatrix} y^j_{1,t} \\ \vdots \\ y^j_{N,t} \end{bmatrix} \quad \mathbf{A}_j = \begin{bmatrix} a^j_{\mathrm{Inc}} \\ \vdots \\ a^j_{P\&L} \end{bmatrix} \quad \mathbf{B}_j = \begin{bmatrix} b^j_{\mathrm{Inc}} \\ \vdots \\ b^j_{P\&L} \end{bmatrix}$$

$$\mathbf{X}_{j,t} = \begin{bmatrix} \text{Inc}^j_{1,t} & \text{Otinc}^j_{1,t} & \text{Exp}^j_{1,t} & \text{Empl}^j_{1,t} & \text{IF}^j_{1,t} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ \text{Inc}^j_{N,t} & \text{Otinc}^j_{N,t} & \text{Exp}^j_{N,t} & \text{Empl}^j_{N,t} & \text{IF}^j_{N,t} \end{bmatrix.$$

$$\left. \begin{matrix} \text{Int}^j_{1,t} & \text{IX}^j_{1,t} & \text{Ex}^j_{1,t} & \text{Tax}^j_{1,t} & P\&L^j_{1,t-1} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ \text{Int}^j_{N,t} & \text{IX}^j_{N,t} & \text{Ex}^j_{n,t} & \text{Tax}^j_{N,t} & P\&L^j_{N,t-1} \end{matrix} \right]$$

$$j = \text{Asset, Finance WC, Debt, Book}$$

$$t = 1, \ldots, T \tag{10}$$

In both models residuals show the characteristic individual effects for each individual (η), that can be considered in panel data as:

(1) Fixed effects, that is, a dummy that shows the particular characteristic for each firm that it is considered to be constant across years.

$$u_{i,t} = \eta_i + \nu \quad \nu_{i,t} \sim N(0, \sigma^2_\nu) \tag{11}$$

where η_i represents the idiosyncratic effect of each firm, i.e. the special characteristics of them, as capital operations (K). On doing so, the constant should not be significant.

(2) Random effects, that is, the particular characteristic for each firm that can vary across years with different variances.

$$u_{i,t} = \eta_{i,t} + \nu_{i,t} \quad \nu_{i,t} \sim N(0, \sigma^2_\nu) \quad \eta_{i,t} \sim N(0, \sigma^2_{\eta_i}) \tag{12}$$

As a difference as before, the idiosyncratic effects are random, following a normal distribution with zero mean – as we add a constant – and variance $\sigma^2_{\eta_i}$ (see Equation (12)). For a static panel, as it is our first case, the main problem is not only the choice between fixed or random effects – which depends on the result of the Hausman test but the consideration of the common factors due to the interdependence between the firms. The Hausman test allows us to check the relationship between regressors and residuals, so, if it does not exist, fixed effects are the correct hypothesis. On the contrary, random effects must be supposed.

In the first case, the consistent estimator is OLS, and in the second one, it is Within. For common factors we must use the Between estimator. In summary, we have to eliminate both types of effects (individual and joint effects). For this purpose, the consistent estimator is GLS from the variance-covariance matrix of weighed residuals that has been obtained in previous estimations by Within and Between. GLS application consists of estimating a modified version of the original model by OLS, subtracting the mean on each observation by individual, weighed by residual variances from Within and Between estimations. Following Arellano (2003):

$$
\begin{aligned}
y_{i,t}-\bar{y}_i &= \sum_{k=1}^{K}\beta_{w,k}(x_{i,t}-\bar{x}_j)+u_{i,t}\rightarrow\sigma_w^2\\
&=\frac{1}{N\tau-N-K}\sum_{i=1}^{N}\sum_{t=1}^{\tau}\left[(y_{i,t}-\bar{y}_i)-\left(\sum_{k=1}^{K}\beta_{w,k}(x_{i,t}-\bar{x}_i)\right)\right]\\
\bar{y}_i &= \sum_{k=1}^{K}\beta_{b,k}\bar{x}_j+e_{i,t}\rightarrow\sigma_b^2=\frac{1}{N-1}\sum_{i=1}^{N}\left[\bar{y}_i-\sum_{k=1}^{K}\beta_{b,k}\bar{x}_i\right]\\
\lambda &= 1-\sqrt{\frac{\sigma_w^2}{\tau\sigma_b^2}}\\
y_{i,t}-\lambda\bar{y}_i &= \sum_{k=1}^{K}\beta_{\mathrm{GLS},k}(x_{i,t}-\lambda\bar{x}_i)+\xi_{i,t}
\end{aligned}
\tag{13}
$$

where, w represents the Within estimation and b Between one.

However, as a result of the unit root test we should estimate the dynamic panel data, we should use the general moment model with instrumental variables since it is necessary to correct $E(W_{i,t},\eta_i)\neq 0$ avoiding $E(W_{i,t},\nu_{i,t})\neq 0$, that is, avoiding exogeneity in the regressors (Anderson and Hsiao, 1982):

$$
\begin{aligned}
Y_{i,t} &= b_0+\rho Y_{i,t-1}+\sum_{k=1}^{K}b_k Y_{i,k,t}+\eta_i+\nu_{i,t}\\
&\text{s.t.}\\
&|\rho|<1\\
\forall t\; E(X_{i,k,t},\nu_{i,t}) &= 0\\
E(Y_{i,t-1},\nu_{i,t}) &= 0
\end{aligned}
\tag{14}
$$

In so doing, the parameters estimation should be (Arellano and Bond, 1991):

$$
\begin{aligned}
\hat{b} &= \left[\left(\sum_i W_i^{*\prime}\cdot Z_i\right)\cdot G\cdot\left(\sum_i Z_i^{\prime}\cdot W_i^{*}\right)\right]^{-1}\\
&\quad\cdot\left(\sum_i W_i^{*\prime}\cdot Z_i\right)\cdot G\cdot\left(\sum_i Z_i^{\prime}\cdot Y_i^{*}\right)\\
G &= \left(\frac{1}{N}\sum_i Z_i^{\prime}\cdot H_i\cdot Z_i\right)
\end{aligned}
\tag{15}
$$

where W^* should be the set of transformed regressors ($\boldsymbol{Y}_{t-1}$ y $\boldsymbol{X}$), $\boldsymbol{Y}^*$ the transformed explicative variable, Z the matrix of instruments – in our study the explicative variable and lagged regressors in levels and/or in differences, $\boldsymbol{H}$ is the matrix of weights, that will be the identity matrix in the first step on the bi-etapic (two-stages) estimation, and it will be estimated from the residuals of the first step, in order to correct heterokedasticity as:

$$\boldsymbol{H}_i = \hat{\nu}_i^* \cdot \hat{\nu}_i^{*\prime} \tag{16}$$

However, when the autoregressive expected parameter is next to 1, as in our case, and T is small, instead of using GMM-IV, Arellano and Bover (1995) and Blundell and Bond (1998) suggest applying a modification known as GMM-SYS, that consists of approaching the problem as a system, i.e. estimating the equation in levels with a set of instruments (lag variables in differences[3]) and at the same time estimating the transformed equation in differences with another set of instruments (lag variables by level).

4. Study case

4.1 Sample description

Data used in the empirical work have been obtained from database Sistema de Análisis de Balances Ibéricos that contains information about more than 700,000 Spanish and Portuguese firms. Selection was made according to the following criteria: Spanish firms, same size (large firms following the definition of the EU[4]), same legal form (corporations), not in bankruptcy situations and with available annual account reports for each year of the period 1994-2004[5].

The result is a balanced panel data with 4,595 firms and 11 annual data by firm. A statistic summary for the variables used in the research is shown in Table I.

Two facts should be pointed out in these statistics. On the one hand, the minimum of Inc, Otinc, and Empl. This means that some firms have no operating revenues and no salaries at all – which is certainly rare. On the other hand, the high levels in IF, Ix, and Ex, means that financial revenues and extraordinary incomes are not atypical but systematic. Adding both issues, we can assume that items that explain the intrinsic value of a firm are not all the items that must be taken into consideration if CSR is supposed. This situation justifies our study, as if CSR is not fulfilled, we should look for the main items in the income statement that can explain variations in the balance sheet items, that is, the items that can give details of the financial position of firms.

Next, in Table II results after applying unit root tests on main variables are shown, in order to determine their stationarity. On doing so, four test have been applied, that is, Levin and Lin (1993), Im *et al.* (1997), Maddala and Wu (1999) and Choi (1999), all of them over four different sample size with the aim of checking the consistency of results since firms have been removed randomly: 100 per cent in the beginning (4,595 firms), 75 per cent (3,446 firms), 50 per cent (2,298 firms) and 25 per cent (1,149 firms).

As can be observed, there is a clear consistency in the test results when the size sample decreases, except in WC case, even though we accept the null in one of the tests and the p-value is close to 5 per cent. So, the stationary variables are in fact stationary, independently of size sample. If we look at the no-stationary variables in some tests, we can point out that they are Book (book value), Exp (ordinary expenses except salaries), Empl (salaries); and Otinc (other non-operating revenues).

4.2 Estimation model results

As unit root tests show enough evidence that some variables are not stationary for some dependent variables (Book and WC), we have chosen to implement both proposed estimations. That is, a dynamic panel AR(1) and a static panel with GLS w/b (Within/Between) for the lagged variables, in order to compare their results.

The dynamic panel estimations are shown in Table III:

Table I.
Statistical variables summary

Items	$T*N$	T	N	Mean	Variance	Skweenes	Kurtosis	Maximum	Minimum
Asset	50,545	11	4,595	6,272,626.436	4.24744E + 14	1.02243E + 23	3.63885E + 31	662,267,400	471,240
Finance	50,545	11	4,595	3,064,196.741	2.61878E + 14	8.09437E + 22	3.68206E + 31	791,228,661	890,920
WC	50,545	11	4,595	6,492,525.041	2.07142E + 14	8.09876E + 21	4.19144E + 30	319,385,563	458,270,000
Debt	50,545	11	4,595	7,322,400.762	3.38654E + 14	6.77762E + 22	2.31434E + 31	635,753,250	103,598,851
Book	50,545	11	4,595	7,285,039.859	4.0401E + 14	1.07996E + 23	5.42161E + 31	1,011,990,033	162,901,000
PL	50,545	11	4,595	876,549.6956	2.19706E + 13	1.22067E + 20	2.09061E + 29	216,504,490	−165,672,684
Exp	50,545	11	4,595	20,619,331.49	1.92823E + 15	6.25389E + 23	3.06764E + 32	978,419,742	32,129,740
Empl	50,545	11	4,595	3,942,969.696	9.97273E + 13	1.61398E + 22	4.799E + 30	472,549,545	0
Inc	50,545	11	4,595	25,684,151.14	2.51536E + 15	8.43296E + 23	4.28946E + 32	970,767,467	0
Otinc	50,545	11	4,595	305,890.8974	4.85176E + 12	2.24758E + 20	1.56098E + 28	112,004,984	0
Int	50,545	11	4,595	423,827.9432	2.17425E + 12	7.12339E + 19	4.54998E + 27	96,450,000	31,865,200
IF	50,545	11	4,595	254,619.9416	1.94921E + 12	1.28747E + 20	1.68743E + 28	166,234,134	310,388
Ex	50,545	11	4,595	167,505.5455	3.75608E + 12	3.28988E + 20	6.78044E + 28	235,522,000	51,625,000
Ix	50,545	11	4,595	179,711.087	3.24516E + 12	7.08421E + 20	2.18438E + 29	323,423,550	12,545
Tax	50,545	11	4,595	394,188.6884	2.41486E + 12	4.64972E + 19	5.16362E + 27	113,906,260	81,948,000

Notes: Asset adds tangible and intangible fixed assets, Finance financial assets, WC is the working capital, i.e. the difference between non-financial current assets and current liabilities, and Debt short and long term financial debts. Book is the book value and PL means profits and losses, Inc is net operating revenues, Otinc is non-operating revenues, Exp represents operating expenses other than salaries, Empl salaries, IF financial revenues, Int financial expenses, Ix extraordinary incomes, Ex extraordinary expenses and Tax taxes for the period

Table II. Stationary test

Variables	Tests	100% (4,595) LL	100% (4,595) IPS	100% (4,595) MW	100% (4,595) CHOI	75% (3,446) LL	75% (3,446) IPS	75% (3,446) MW	75% (3,446) CHOI	50% (2,298) LL	50% (2,298) IPS	50% (2,298) MW	50% (2,298) CHOI	25% (1,149) LL	25% (1,149) IPS	25% (1,149) MW	25% (1,149) CHOI
ASSET	Test	3.4001	−2.5358	8.3859	21.7950	1.5223	−2.6882	8.3894	18.3576	2.3658	−2.2201	8.1991	14.5183	1.6583	−1.9117	8.0891	10.0792
	(*p*-value)	0.0002	0.0028	0.0151	0.0000	0.0320	0.0018	0.0151	0.0001	0.0045	0.0066	0.0166	0.0007	0.0243	0.0140	0.0175	0.0065
FINANC	Test	2.8831	−6.0253	8.4356	16.9355	1.7962	−2.1455	8.3295	14.3394	2.4631	−3.9917	8.4756	12.0409	1.7410	−5.4641	8.5791	8.7344
	(*p*-value)	0.0010	0.0000	0.0147	0.0002	0.0181	0.0080	0.0155	0.0008	0.0034	0.0000	0.0144	0.0024	0.0204	0.0000	0.0137	0.0127
WC	Test	4.8211	−1.6792	7.7826	19.2657	1.2525	−1.1806	5.7334	6.5426	3.5373	−1.6184	7.8179	13.6876	1.2796	−1.1449	6.8856	9.7868
	(*p*-value)	0.0000	0.0233	0.0204	0.0001	0.0526[a]	0.0594[a]	0.0569[a]	0.0380	0.0001	0.0264	0.0201	0.0011	0.0502[a]	0.0631[a]	0.0320	0.0075
DEBT	Test	3.4755	−1.9933	7.8120	18.8733	1.5542	−1.9465	7.7956	16.2872	2.7941	−1.9217	7.8569	13.4518	1.8569	−1.7091	7.7973	9.4194
	(*p*-value)	0.0001	0.0116	0.0201	0.0001	0.0300	0.0129	0.0203	0.0003	0.0013	0.0137	0.0197	0.0012	0.0158	0.0219	0.0203	0.0090
BOOK	Test	2.3848	−1.1681	8.1148	20.1045	1.1125	−1.1443	5.0707	7.3068	1.7638	−1.7774	8.0253	14.0146	1.9828	−1.8720	8.0828	10.0136
	(*p*-value)	0.0043	0.0607[a]	0.0173	0.0000	0.0665[a]	0.0631[a]	0.0792[a]	0.0259	0.0194	0.0189	0.0181	0.0009	0.0118	0.0153	0.0176	0.0067
PL	Test	1.9804	−2.4157	8.3529	21.0751	1.1266	−2.4617	8.3850	18.3617	4.4989	−2.5054	8.4521	15.1144	2.7715	−2.5028	8.4776	10.7565
	(*p*-value)	0.0119	0.0039	0.0154	0.0000	0.0650[a]	0.0035	0.0151	0.0001	0.0000	0.0031	0.0146	0.0005	0.0014	0.0031	0.0144	0.0046
Exp	Test	2.9003	−1.0777	7.5805	18.5714	4.6710	−1.1063	7.5654	16.0434	2.3960	−1.0207	7.5266	12.9876	2.4222	−0.9623	7.3317	8.8537
	(*p*-value)	0.0009	0.0703[a]	0.0226	0.0001	0.0000	0.0671[a]	0.0228	0.0003	0.0041	0.0768[a]	0.0232	0.0015	0.0039	0.0840[a]	0.0256	0.0120
Empl	Test	2.4944	−0.6590	7.5512	18.4153	2.1064	−0.7124	7.5977	16.0853	1.5266	−0.6629	7.5186	12.9246	2.5605	−0.7759	7.3605	8.8611
	(*p*-value)	0.0032	0.1275[a]	0.0229	0.0001	0.0088	0.1191[a]	0.0224	0.0003	0.0317	0.1268[a]	0.0233	0.0016	0.0026	0.1095[a]	0.0252	0.0119
Inc	Test	2.5494	−1.3985	7.7312	19.0038	2.1556	−1.3810	7.6697	16.2875	2.2058	-1.3419	7.6467	13.2185	1.6689	−1.0935	7.5051	9.1042
	(*p*-value)	0.0027	0.0405	0.0210	0.0001	0.0078	0.0418	0.0216	0.0003	0.0068	0.0449	0.0219	0.0013	0.0238	0.0685	0.0235	0.0105
Otinc	Test	0.1250	−1.5064	12.5859	61.2703	0.0870	−1.9224	1.2427	1.6123	0.0428	−3.0171	9.2449	29.4290	0.0832	−1.6080	5.9041	10.1431
	(*p*-value)	0.2251[a]	0.0330	0.0018	0.0000	0.2327[a]	0.0136	0.5372[a]	0.4466[a]	0.2415[a]	0.0006	0.0098	0.0000	0.2334[a]	0.0270	0.0522[a]	0.0063
Int	Test	5.6428	−3.2635	8.8595	22.4381	2.2648	−3.3802	8.8621	19.4636	4.2022	−3.4659	8.7717	15.6484	1.9163	−3.2049	8.8198	11.1385
	(*p*-value)	0.0000	0.0003	0.0119	0.0000	0.0059	0.0002	0.0119	0.0001	0.0000	0.0001	0.0125	0.0004	0.0138	0.0003	0.0122	0.0038
IF	Test	4.7167	−3.9381	8.8096	22.0839	1.0572	−3.7727	8.7110	18.8507	4.7487	−3.8286	8.7270	15.3952	2.5642	−3.3179	8.4085	10.3136
	(*p*-value)	0.0000	0.0000	0.0122	0.0000	0.0726[a]	0.0000	0.0128	0.0001	0.0000	0.0000	0.0127	0.0005	0.0026	0.0002	0.0149	0.0058
Ex	Test	3.6711	−2.9852	8.2204	16.6883	2.5838	−3.2785	8.2420	14.4074	2.2587	−3.5104	8.1523	11.5877	2.6936	−2.3191	8.1559	8.2877
	(*p*-value)	0.0001	0.0007	0.0164	0.0002	0.0024	0.0003	0.0162	0.0007	0.0060	0.0001	0.0170	0.0030	0.0018	0.0051	0.0169	0.0159
Ix	Test	3.3418	−4.8817	8.7848	18.7444	2.4186	−4.3373	8.7229	16.0613	3.6237	−3.5226	8.6773	12.9823	1.6371	−3.3372	8.4170	8.8453
	(*p*-value)	0.0002	0.0000	0.0124	0.0001	0.0039	0.0000	0.0128	0.0003	0.0001	0.0001	0.0131	0.0015	0.0254	0.0002	0.0149	0.0120
Tax	Test	4.6523	−2.3621	8.3229	18.5503	1.5626	−2.3683	8.3741	16.2508	4.0953	−2.3865	8.4771	13.5517	2.5504	−2.4215	8.4194	9.5053
	(*p*-value)	0.0000	0.0045	0.0156	0.0001	0.0295	0.0045	0.0152	0.0003	0.0000	0.0043	0.0144	0.0011	0.0027	0.0039	0.0149	0.0086

Note: [a]Represents non stationary

Table III.
Parameters of dynamic panel data

Variables		$Y(-1)$	PL(−1)	Exp	Empl	Inc	Otinc	Int	IF	Ex	Ix	Tax	Constant
ASSET	Coefficient	0.9790	0.5561	0.2563	0.7179	−0.3558	−0.6406	0.5430	3.3947	−0.9419	0.1113	0.6958	0.0000
	SE	0.0435	0.8357	0.6900	0.6950	0.6949	0.7458	0.6944	4.0500	1.3570	1.2260	2.5530	0.0000
	t-value	22.5000	0.6650	0.3710	1.0300	−0.5120	−0.8590	0.7820	0.8380	−0.6940	0.0907	0.2730	−0.7120
	t-probability	0.0000	0.5060	0.7100	0.3020	0.6090	0.3900	0.4340	0.4020	0.4880	0.9280	0.7850	0.4760
FINANCE	Coefficient	0.9194	−0.0671	−0.2279	−0.2022	0.2285	0.2428	−0.1168	1.1733	−0.0991	0.0935	−0.1133	129.8600
	SE	0.0230	0.1052	0.1225	0.1232	0.1238	0.1190	0.2766	0.2017	0.1569	0.1153	0.2348	52,360.0000
	t-value	40.0000	−0.6380	−1.8600	−1.6400	1.8500	2.0400	−0.4220	5.8200	−0.6320	0.8110	−0.4820	0.0025
	t-probability	0.0000	0.5240	0.0630	0.1010	0.0650	0.0410	0.6730	0.0000	0.5280	0.4170	0.6300	0.9980
WC	Coefficient	0.6446	0.4850	−0.6575	−1.2352	0.8147	1.0308	0.0303	−0.7746	−2.0462	2.1668	1.1179	0.0000
	SE	0.2488	1.8760	0.9630	1.4200	1.0100	1.3960	3.0590	0.8331	2.4470	2.2690	4.4120	0.0000
	t-value	2.5900	0.2590	−0.6830	−0.8700	0.8070	0.7390	0.0099	−0.9300	−0.8360	0.9550	0.2530	−0.1780
	t-probability	0.0100	0.7960	0.4950	0.3840	0.4200	0.4600	0.9920	0.3520	0.4030	0.3400	0.8000	0.8590
DEBT	Coefficient	0.8326	−0.0487	0.0039	0.0531	0.0093	0.3824	1.4574	0.0224	0.4644	0.1331	0.1389	457,551.0000
	SE	0.0434	0.0816	0.0940	0.0984	0.0942	0.1235	0.4095	0.1699	0.2121	0.0969	0.2516	74,580.0000
	t-value	19.2000	−0.5970	0.0411	0.5400	0.0983	3.1000	3.5600	0.1320	2.1900	1.3700	0.5520	6.1300
	t-probability	0.0000	0.5510	0.9670	0.5890	0.9220	0.0020	0.0000	0.8950	0.0290	0.1690	0.5810	0.0000
BOOK	Coefficient	0.9077		0.5893	0.6437	−0.5821	−0.4919	1.0445	−0.2174	0.4823	−0.8765	0.9455	408,279.0000
	SE	0.0819		0.1688	0.1757	0.1684	0.1612	0.2491	0.4399	0.1747	0.2564	0.3609	163,000.0000
	t-value	11.1000		3.4900	3.6600	−3.4600	−3.0500	4.1900	−0.4940	2.7600	−3.4200	2.6200	2.5000
	t-probability	0.0000		0.0000	0.0000	0.0010	0.0020	0.0000	0.6210	0.0060	0.0010	0.0090	0.0120

Note: We should remember that in the BOOK case, explicative variables are lagged one period

From the results, we can see that both Asset and WC follow an AR(1) process, where items from the income statement have no explicative power. Finace shows an autoregressive process, and both IF (financial revenues) – as could be expected – and Otinc (non-operative revenues) have explicative power in his final balance. With respect to liabilities, it is remarkable that both in Book and Debt the constant is significant as opposed to the asset items, Debt is explained by AR(1) process, Int (financial expenses), Otinc (as financial assets) and Ex (non-operative expenses); and Book is explained by operative expenses (Exp, Empl), revenues (Inc, Otinc), financial expenses (Int) and taxes (Tax), but, surprisingly, the extraordinary items (Ix, Ex) must be added to those ones.

Finally, it is important to remark that even the parameter for the items in the income statements must be close to 1 in absolute value – as was pointed out previously – it only occurs in some isolated cases, as in financial revenues in Finance equation and financial expenses in Debt equation.

In summary, the final balance of tangible and intangible assets and the working capital does not depend on the items in the income statement. In addition, financial revenues take part in financial assets, so they can not be excluded in the model under the assumption that financial asset are market valued. With regard to liabilities, it must be pointed out that an unconditional mean exists, that is, it is obvious that not all changes in the liability value are reflected in the income statement. In particular, financial debts are of course explained by financial expenses, but surprisingly other items are involved – the same as in the case of financial assets – that is non-operating revenues.

Regarding the constant, it records the mean value of the balance sheet items that cannot be explained by the income statement, therefore they are explained by the rest of operations that are not registered in the income statement. Data shows that this constant is significant in Finance, Debt, and Book. It means that the accounting policies in the firms' sample can not always distinguish properly between financial and operating activities; finally, with regard to book value, the milestone of clean surplus, it must be pointed out that extraordinary items show a high statistical significance.

With respect to the dynamic estimation, Table IV shows the main tests and contrast of the models.

The two first tests (Wald) check whether the parameters associated with the regressors and the constant have statistical significance. As was expected, they are significant in the first case, since, at least, the parameter of the autoregressive process is not null in all the cases; in relation to the constant, it was significant in the same cases as *t*-value, that is, the liability items.

On one hand, the Sargan test shows the validity of instrumental variables used in each model, and as it can be observed, the null is widely accepted in all cases. Finally, AR(1) and AR(2) tests on residuals accept the null in all cases, i.e. autocorrelation on residuals does not exist, since it is included in the estimated dynamic model.

On the other hand, in relation to GLS estimation on variables in differences, we have implemented two operations: the first one, individually, one for each patrimonial item, and the second one, jointly, that is, all together in order to correct cross correlations between patrimonial items. Results are shown in Table V.

On the basis of these results it can be shown that variations in the value of tangible and intangible assets in firms are explained by all items of the income statement plus a constant.

Table IV.
Test on dynamic panel data

Test	Distribution	ASSET Test-value	ASSET p-value	FINANCE Test-value	FINANCE p-value	WC Test-value	WC p-value	DEBT Test-value	DEBT p-value	BOOK Test-value	BOOK p-value
Wald (joint)	$\chi^2(11^a)$	9,530.000	[0.000]	715.300	[0.000]	392.700	[0.000]	1,258.000	[0.000]	6,621.000	[0.000]
Wald (dummy)	$\chi^2(1)$	0.507	[0.476]	6.15E-06	[0.998]	0.032	[0.859]	37.640	[0.000]	6.271	[0.012]
Sargan	$\chi^2(41)$	42.660	[0.400]	36.800	[0.658]	19.130	[0.999]	36.010	[0.692]	29.440	[0.911]
AR(1)	$N(0.1)$	1.840	[0.066]	1.663	[0.096]	0.696	[0.487]	1.271	[0.204]	−0.994	[0.320]
AR(2)	$N(0.1)$	1.780	[0.075]	1.423	[0.155]	0.952	[0.341]	1.791	[0.073]	0.423	[0.672]

Note: [a]In BOOK case, there are only ten variables or freedom degree

Table V. Parameters for GLS estimation (w/b) individual and joint

Variables		PL(−1)	Exp	Empl	Inc	Otinc	Int	IF	Ex	Ix	Tax	Constant
Individual estimation												
DASSET	Coefficient	0.0913	0.0458	0.0723	−0.0539	−0.1095	0.9207	−0.1715	0.1275	−0.0858	0.1776	203,592.0000
	SE	0.0083	0.0091	0.0094	0.0091	0.0141	0.0205	0.0194	0.0135	0.0151	0.0254	29,790.0000
	t-value	11.0000	5.0300	7.7200	−5.9500	−7.7600	45.0000	−8.8500	9.4700	−5.6800	6.9900	6.8300
	t-probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DFINANCE	Coefficient	−0.1350	−0.2191	−0.2026	0.2183	0.2425	−0.1247	0.8982	−0.1129	0.0719	−0.1313	6,161.7900
	SE	0.0108	0.0108	0.0109	0.0108	0.0169	0.0216	0.0204	0.0164	0.0186	0.0274	24,940.0000
	t-value	−12.6000	−20.3000	−18.5000	20.3000	14.4000	−5.7900	43.9000	−6.8700	3.8600	−4.7900	0.2470
	t-probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.8050
DWC	Coefficient	−0.2195	−0.2287	−0.2300	0.2391	0.5434	−0.1707	−0.2282	−0.0622	0.1409	−0.0770	251,191.0000
	SE	0.0132	0.0133	0.0135	0.0132	0.0208	0.0266	0.0252	0.0203	0.0230	0.0338	30,750.0000
	t-value	−16.6000	−17.2000	−17.1000	18.1000	26.1000	−6.4300	−9.0600	−3.0700	6.1400	−2.2800	8.1700
	t-probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0020	0.0000	0.0230	0.0000
DDEBT	Coefficient	0.0006	0.0285	0.0374	−0.0262	0.2320	0.5505	−0.0574	0.4513	0.0151	0.1178	230,585.0000
	SE	0.0132	0.0133	0.0135	0.0133	0.0209	0.0269	0.0255	0.0203	0.0230	0.0342	31,470.0000
	t-value	0.0449	2.1400	2.7600	−1.9700	11.1000	20.5000	−2.2500	22.2000	0.6570	3.4400	7.3300
	t-probability	0.9640	0.0320	0.0060	0.0490	0.0000	0.0000	0.0240	0.0000	0.5110	0.0010	0.0000
DBOOK	Coefficient		0.5972	0.6240	−0.5943	−0.4924	0.9152	−0.4930	0.4478	−0.8264	0.8103	191,536.0000
	SE		0.0135	0.0136	0.0134	0.0209	0.0259	0.0246	0.0205	0.0233	0.0330	28,630.0000
	t-value		44.4000	45.9000	−44.3000	−23.5000	35.3000	−20.1000	21.8000	−35.5000	24.6000	6.6900
	t-probability		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Joint estimation												
DASSET	Coefficient	0.1085	0.0443	0.0683	−0.0490	−0.0471	0.7938	−0.1995	0.0864	−0.0413	0.1172	171,691.0000
	SE	0.0121	0.0122	0.0124	0.0122	0.0192	0.0248	0.0235	0.0186	0.0211	0.0315	29,260.0000
	t-value	8.9800	3.6300	5.5100	−4.0200	−2.4600	32.0000	−8.4900	4.6400	−1.9600	3.7200	5.8700
	t-probability	0.0000	0.0000	0.0000	0.0000	0.0140	0.0000	0.0000	0.0000	0.0500	0.0000	0.0000
DFINANCE	Coefficient	−0.1320	−0.2206	−0.2038	0.2200	0.2382	−0.1298	0.8804	−0.1190	0.0746	−0.1421	7,625.3300
	SE	0.0121	0.0122	0.0124	0.0122	0.0192	0.0248	0.0235	0.0186	0.0211	0.0315	29,260.0000
	t-value	−10.9000	−18.1000	−16.4000	18.1000	12.4000	−5.2400	37.5000	−6.3900	3.5400	−4.5100	0.2610
	t-probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7940

(Continued)

Table V.

Variables		PL(−1)	Exp	Empl	Inc	Otinc	Int	IF	Ex	Ix	Tax	Constant
DWC	Coefficient	−0.2176	−0.2269	−0.2283	0.2372	0.5390	−0.1631	−0.2273	−0.0617	0.1452	−0.0767	251,809.0000
	SE	0.0121	0.0122	0.0124	0.0122	0.0192	0.0248	0.0235	0.0186	0.0211	0.0315	29,260.0000
	t-value	−18.0000	−18.6000	−18.4000	19.5000	28.1000	−6.5800	−9.6700	−3.3100	6.8900	−2.4300	8.6100
	t-probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000	0.0150	0.0000
DDEBT	Coefficient	0.0016	0.0289	0.0378	−0.0266	0.2280	0.5563	−0.0609	0.4518	0.0185	0.1174	230,967.0000
	SE	0.0121	0.0122	0.0124	0.0122	0.0192	0.0248	0.0235	0.0186	0.0211	0.0315	29,260.0000
	t-value	0.1360	2.3600	3.0500	−2.1800	11.9000	22.4000	−2.5900	24.3000	0.8790	3.7300	7.8900
	t-probability	0.8920	0.0180	0.0020	0.0290	0.0000	0.0000	0.0100	0.0000	0.3790	0.0000	0.0000
DBOOK	Coefficient		0.5975	0.6247	−0.5944	−0.5192	0.9170	−0.5092	0.4433	−0.8517	0.8002	203,958.0000
	SE		0.0122	0.0124	0.0122	0.0192	0.0248	0.0235	0.0186	0.0211	0.0315	29,260.0000
	t-value		48.9000	50.4000	−48.8000	−27.1000	37.0000	−21.7000	23.8000	−40.4000	25.4000	6.9700
	t-probability		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note: We should remember that in the BOOK case, explicative variables are lagged one period

For the financial assets, all items in the income statement are significant, except for the constant, unlike the non-financial asset. Moreover, and unlike the non-financial asset, the parameters do not vary in a significant way from individual to joint estimation. Therefore, we can conclude that financial assets do not show special relationship with the rest of patrimonial items. Working capital is explained again for all items of the income statement plus a constant. As for liabilities, financial debt and book value are explained for all items plus a constant. Only for book value the financial expenses parameter is close to abs(1).

In summary, there are some facts can be pointed out. First at all, firms in our sample show unconditional variations – not related with the income statement, that are measured by a constant for non-financial assets and working capital in the investment side, and financial debt and book value in the financing side. Second, financial assets are the only ones that seem not to have a relationship with the rest of the patrimonial items. It can be checked by looking at the changes in the parameter values on the individual estimation against the joint estimation.

Finally, we add some tests over the estimated models by GLS, that are shown in Table VI.

From these tests we can check the joint statistical significance of regressors (Wald joint) in all cases, and the constant (Wald dummy) in all cases except for financial assets; subsequently, these results are the same as the results obtained with the previous tests. The lower explicative power of the models in difference must be pointed out, since R^2 is between 5 and 10 per cent. Finally, AR(1) and AR(2) tests show that autocorrelation of first and second order does not exist.

5. Conclusions

The main goal of this paper has been to locate the specific items from the financial statements that are responsible for the dirty surplus accounting flows and how important they are in its explanation. In order to do this, panel data econometric techniques have been applied to a sample of Spanish firms. Specifically, we have used a static and dynamic panel data with the aim of contrasting the theoretical model.

We have estimated a static panel where dependent variables were taken in first differences and only income statement items have been taken into account. Results show that the items of the income statement have a lower explicative power (low R^2) over the patrimonial items variations, and the constant of this model is significant. On the one hand, it does not mean that other operations not related with the income statement can explain the model, but this model is not the best that can be used. On the other hand, revenues and expenses items have lower explicative power as the parameters obtained have an absolute value less than one.

A dynamic panel has also been estimated. The results show, unlike before, that the constant is significant in Finance, Debt, and Book, but, again, revenues and expenses items have lower explicative power. That is, all AR(1) processes are significant and their parameters are less than one. Taking into account that finance and debt items are market value, and the book value record all the changes in them, the fact that the constant is significant indicates that there are some movements in these items that can not be explained by the income statement, therefore they are explained by the rest of operations that are not registered in the income statement. That is, these three items give us statistical evidence of the existence of dirty surplus accounting flows and, specifically, where they are located.

Table VI.
Estimation test
GLS (w/b)

Test	Distribution	DASSET Test-value	DASSET p-value	DFINANCE Test-value	DFINANCE p-value	DWC Test-value	DWC p-value	DDEBT Test-value	DDEBT p-value	DBOOK Test-value	DBOOK p-value	GLOBAL Test-value	GLOBAL p-value
Wald (joint)	$\chi^2(*)$	2,664.000	[0.000]	3,735.000	[0.000]	1,692.000	[0.000]	2,418.000	[0.000]	5,282.000	[0.000]	15,620.000	[0.000]
Wald (dummy)	$\chi^2(1)$	46.690	[0.000]	0.06103	[0.805]	66.740	[0.000]	53.700	[0.000]	44.770	[0.000]	219.500	[0.000]
AR(1)	$N(0.1)$	0.3268	[0.628]	−0.2246	[0.4111]	−0.5429	[0.294]	−1.2846	[0.099]	−1.5124	[0.065]	−0.7139	[0.238]
AR(2)	$N(0.1)$	−0.8162	[0.415]	−0.116	[0.454]	0.2982	[0.617]	−0.9267	[0.177]	−0.5628	[0.287]	0.2935	[0.615]
R^2		5.48%		7.52%		3.55%		5.00%		10.31%		6.41%	
Ponderación		0.1037		−0.4928		−0.4918		−0.4570		−0.6903		−0.4195	

Note: *In the global estimation, we have 49 variables, ten per dependent variable, except in book, with nine

To conclude, the econometric technique proposed in this paper deal with the main limitation in accounting research: information is bigger in cross-section (number of firms) than in time series (economic periods). As it has been shown, working in differences reduces the explicative power of the income statement and working in levels could be inconsistent if it is impossible to contrast, first, stationary in data due to their shortage. We suggest for future works to increase the frequency of the observed data, and to contrast the cointegration of accounting variables as a way to check the accounting relationships.

Notes

1. Extraordinary expenses and revenues includes atypical results and results not related to the main activity of the firm or derived from its finance as results due to the sale of fixed assets.
2. Instead to considerer expenses, losses, revenues and incomes after taxes, we prefer to contrast how tax decisions have influence over book value, i.e. taxes can be one more item to take into account in the dirty surplus relation if they do not affect all elements in the same way.
3. The lags depend on the moment the observation takes place. So, for y_{t+2} that it is explained by y_{t+1}, y_t could be used. For y_{t+3} that depends on y_{t+2}, we use (y_{t+1}, y_t), and so on, both in levels or differences.
4. In order to classify firms by their size, Commission Recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises has been followed. In Appendix 2, Art. 2 the definitions of micro, small and medium-sized enterprises adopted by the commission are "1. The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million. 2. Within the SME category, a small enterprise is defined as an enterprise which employs fewer than 50 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 10 million. 3. Within the SME category, a microenterprise is defined as an enterprise which employs fewer than 10 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 2 million".
5. Economic year 2005 is not included, since it is the first year that listed firms must apply IFRS, and some inconsistency with previous data could appear.

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Appendix 1

Among unit root tests over panel data, Levin and Lin (1993), Im *et al.* (1997), Maddala and Wu (1999) test stand out, and particularly, a variation of the last one, when individuals are high enough (Choi, 1999). The next OLS model is estimated for all of them for each individual i:

$$\Delta Y_{i,t} = \alpha_i Y_{i,t-1} + \sum_{j=1}^{P} \beta_{i,j} \Delta Y_{i,t-j} + \eta_i + \varepsilon_{i,t} \tag{17}$$

where η represents individual effects and P the number of lags that are significant and can minimize the Akaike Information Criteria. The difference between both tests is the hypothesis to be contrasted.

- Levin and Lin (1993): in this case, the null hypothesis is that the variable is no stationary. So, if it is rejected, its behaviour is stationary. The main inconvenient is this test is an strong restriction over parameter α since it must be the same for all individuals:

$$\begin{aligned} H_0 &: \forall i \quad \alpha_i = \alpha = 0 \\ H_1 &: \forall i \quad \alpha_i = \alpha < 0 \end{aligned} \tag{18}$$

  been the statistic:

$$t_{LL} = \frac{t_\alpha - N \cdot T^* \cdot S \cdot \hat{\sigma}_e^{-2} \cdot \hat{\sigma}_\alpha \cdot k_1}{k_2} \sim N(0,1) \tag{19}$$

  where N is the number of individuals, k_1 and k_2 are calculated in Levin and Lin (1993, Table II, p. 33) and the rest of parameters should be estimated as in Appendix 2.

- Im *et al.* (1997): in this case, different parameters across individuals are allowed, so, if the null is rejected, it means that some individuals show a stationary behaviour. The estimated statistic is a mean of the t-values obtained in Equation (17) for each individual, that it is normally distributed, with mean zero and variance 1:

$$\bar{t} = \frac{1}{N}\sum_{i=1}^{N} t_{\alpha_i} = \frac{1}{N}\sum_{i=1}^{N}\frac{\alpha_i}{\mathrm{std}(\alpha_i)}$$
$$t_{\mathrm{IPS}} = \sqrt{N}\cdot\frac{\bar{t}-m}{s}\sim N(0,1) \qquad (20)$$

where m and s are the means of individual values of ADF-test and their standard deviations, respectively; these values can be observed in Im *et al.* (1997, Table II).

- Maddala and Wu (1999) and Choi (1999): In this test, hypotheses are as above, been the statistic different but comparable, since the p-value is used instead the t-value

$$t_{\mathrm{MW}} = -2\sum_{i=1}^{N}\ln p\ \mathrm{value}(t_{\alpha_i})\sim\chi^2_{2N}$$
$$t_{\mathrm{Choi}} = \frac{1}{\sqrt{2}}\sum_{i=1}^{N}[-2\ln p\ \mathrm{value}(t_{\alpha_i})-2]\sim\chi^2_{2N} \qquad (21)$$

Appendix 2

Steps on estimating parameters in Levin and Lin (1993) test:

(1) To estimate regressions by individuals

$$\begin{cases} \Delta y^*_{i,t} = \lambda_{0,i} + \alpha_i y^*_{i,t-1} + \sum_{h=1}^{\mathrm{lag}_i}\beta_{i,h}\Delta y^*_{i,t-h} + \xi_{i,t} \\ y^*_{i,t} = y_{i,t} - \bar{y}_t \quad \bar{y}_t = \frac{1}{N}\sum_{i=1}^{N} y_{i,t} \\ \Delta y^*_{i,t} = y^*_{i,t} - y^*_{i,t-1} \end{cases} \qquad (22)$$

$$\{\Delta y_{i,t} = \lambda_{0,i} + \sum_{h=1}^{\mathrm{lag}_i}\beta_{i,h}\Delta y_{i,t-h} + e_{i,t}$$

$$\{y_{i,t-1} = \lambda_{0,i} + \sum_{h=1}^{\mathrm{lag}_i}\beta_{i,h}\Delta y_{i,t-h} + v_{i,t-1}$$

(2) To estimate:

$$\hat{\sigma}_{e_i} = \sqrt{\frac{1}{T-\mathrm{lag}_i-1}\sum_{t=\mathrm{lag}_i+2}^{T}(\hat{e}_{i,t}-\alpha_i\hat{v}_{i,t-1})^2}$$

$$\tilde{e}_{i,t} = \frac{\hat{e}_{i,t}}{\hat{\sigma}_{e_i}} \quad \tilde{v}_{i,t-1} = \frac{\hat{v}_{i,t-1}}{\hat{\sigma}_{e_i}} \qquad (23)$$

(3) To calculate:

$$\hat{\sigma}_{y_i} = \frac{1}{T-1}\sum_{t=2}^{T}(\hat{\Delta}y^*_{i,t})^2 + 2\sum_{d=1}^{Z} w_{Z,d}\left[\frac{1}{T-1}\sum_{t=d+2}^{T}(\hat{\Delta}y^*_{i,t}\cdot\hat{\Delta}y^*_{i,t-d})\right]$$

$$\hat{\Delta}y^*_{i,t} = \hat{\Delta}y^*_{i,t} - \bar{\Delta}y^*_{i,t} \quad \bar{\Delta}y^*_{i,t} = \frac{1}{T}\sum_{t=1}^{T}\Delta y^*_{i,t} \tag{24}$$

$$w_{Z,d} = 1 - \frac{d}{Z+1}$$

where Z is the lag truncation parameter, following recommendations in Levin and Lin (1993, Table II, p. 3)

(4) Finally, next parameters and panel data of typified residuals in Equation (23) are estimated,

$$\begin{cases} T^* = T - L - 1 \quad L = \frac{1}{N}\sum_{i=1}^{N}\text{lag}_i \\ s_i = \frac{\hat{\sigma}_{y_i}}{\hat{\sigma}_{e_i}} \qquad S = \frac{1}{N}\sum_{i=1}^{N} s_i \end{cases}$$

$$\begin{cases} \tilde{e}_{i,t} = \alpha\tilde{v}_{i,t-1} + \tilde{\xi}_{i,t} \rightarrow t_\alpha = \frac{\hat{\alpha}}{\hat{\sigma}_\alpha} \\ \hat{\sigma}_\xi = \sqrt{\frac{1}{NT^*}\sum_{i=1}^{N}\sum_{t=\text{lag}_i+2}^{N}(\tilde{e}_{i,t} - \hat{\alpha}\tilde{v}_{i,t-1})^2} \\ \hat{\sigma}_\alpha = \hat{\sigma}_\xi\sqrt{\sum_{i=1}^{N}\sum_{t=\text{lag}_i+2}^{N}(\tilde{v}_{i,t-1})^2} \end{cases} \tag{25}$$

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