Corporate net income smoothing: A variance decomposition approach

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Abstract

This study introduces a comprehensive framework for depicting the channels through which managers can mitigate sales shocks' impact on a firm's net income. Utilizing a sample of 2,254,805 European companies from 2003 to 2018 and employing a variance decomposition approach, this research provides insights into the proportion of sales shock absorbed through different net income smoothing channels at the firm level. This is achieved by controlling for the nature (positive vs. negative) and the duration (persistent vs. transitory) of sales shocks. Additionally, our findings offer significant insights into dividend smoothing. Research implications for theory and practice are further explored.

Keywords: Sales shocks, Net income smoothing channels, Net income smoothing, Variance decomposition approach; Risk transfer

1. Introduction

Income smoothing, also known as earnings smoothing, is a pivotal and prevalent aspect of managerial conduct (Baik et al., 2022; Liao et al., 2023). A survey conducted by Graham et al. (2005) reveals that an impressive 96.9% of CFOs interviewed favor a consistent earnings trajectory, with 89.6% aiming to sustain a steady dividend flow. Beidleman's pioneering work defines it as "the intentional dampening of fluctuations about some level of earnings that is currently considered to be normal for a firm" (1973, p. 653), and even the earliest studies suggest that stabilizing income against sales shocks is a valid goal for managerial actions (Gordon, 1964).

Research on income smoothing bifurcates into two primary inquiries. The initial line of questioning explores whether companies exhibit a consistent earnings path and the motives behind such practices. Early research provides extensive evidence that corporate managers frequently attempt to minimize fluctuations in publicly reported earnings (Trueman & Titman, 1988). The literature presents two principal theories regarding managerial motives for smoothing income: one suggests that managers smooth reported income to relay private insights into the earnings stream, thereby enhancing the utility of accounting information for valuation

purposes (e.g., Chaney & Lewis, 1995; Tucker & Zarowin, 2006; Badertscher et al., 2012; Gao & Zhang, 2015; Baik et al., 2022). Conversely, the garbling perspective indicates that managers employ income smoothing to distort net income opportunistically, thereby augmenting their benefits (e.g., Fudenberg & Tirole, 1995; Leuz et al., 2003; Sun & Zhang, 2023). The second area of study ties income stability to changes in sales, probing the mechanisms behind smoothing practices (Eckel, 1981) and distinguishing between non-discretionary (natural occurrences) and discretionary (deliberate adjustments) actions. This includes both 'real smoothing,' based on actual transactions, and 'artificial smoothing.' which involves shifting costs and/or revenues between periods (Dascher & Malcom, 1976). More recent research highlights smoothing as a buffer against sales shocks, identifying various channels through which these shocks are mitigated (Lambrecht & Myers, 2012; Hoang & Hoxha, 2016; Fliers, 2018; Baik et al., 2020; Kilincarslan, 2021; Balli et al., 2022).

Despite these insights, there remains room for further exploration into the mechanisms of smoothing about sales shocks, particularly beyond the limited scope of specific variables currently analyzed in existing research. For instance, Eckel (1981) anchors the income variability to that of sales, arguing that if the time series variability of sales is greater than that of income, then the firm does artificial smoothing. Kjærland et al. (2021) show that firms resort to artificial smoothing, adjusting their earnings by abnormal income-decreasing accruals in response to prices shocks. Baik et al. (2022) argue that managers use R&D management to smooth temporary shocks to earnings. Hoang & Hoxha (2016), Balli et al. (2022), and Fliers (2018) measure the smoothness of payouts by examining adjustments to investment and debt channels induced by net income shocks. These studies assume that managers focus on selected variables to smooth the net income. In this study we removed such an assumption and conceived managers of firms to use simultaneously different smoothing channels to smooth the effect of sales shocks on net income. Moreover, extant study supposes that the extent of income smoothing and smoothing channels used are somehow independent on sales shocks sign (positive vs negative) and type (i.e., persistent vs transitory) at the firm level. It may not be the case. For example, research at the firm level has noted discrepancies in how positive and negative shocks are transferred to net income, and in the specific channels managers prioritize during periods of persistent downturns (Fliers, 2018; Abou El Sood, 2012).

Our study aims to construct a comprehensive framework incorporating all potential income smoothing channels at the firm level, accounting for the sign and type of sales shocks. Thanks to such a model, extending

the Asdrubali, Sørensen, & Yosha (1996) (hereafter "ASY") methodology, which decomposes cross-sectional variance in Gross-State product, we empirically apply it to the context of firm-level net income. This approach has previously been limited to examining the role of investments and financial debt in smoothing the impact of net income shocks on dividend payouts (Hoang & Hoxha, 2016; Balli et al., 2022).

Based on an extensive dataset of 2,254,805 European companies from 2003-2018, we present empirical evidence that some income smoothing channels are favored over others at the firm level. It enables us to empirically evaluate the hierarchy of channels used in smoothing income and their difference in absorbing positive or negative, persistent or transitory sales shocks. Furthermore, we correlate income smoothing with dividend stabilization, showing that net income smoothing channels primarily facilitate smoother dividend distributions.

This study enriches the income smoothing discourse in multiple ways. Firstly, it offers a comprehensive model that examines all net income smoothing channels at the firm level, a significant departure from prior studies that have focused on specific channels (e.g., Eckel, 1981; Hoang & Hoxha 2016; Kjærland et al., 2021; Baik et al., 2022). Secondly, it refines our understanding of how the sign and persistency of shocks influence smoothing mechanisms (e.g., Fliers, 2018; Baik et al., 2022). Thirdly, it proposes that smoothing channels serve as a means for firms to distribute risk among their stakeholders, preserving a stable income and safeguarding shareholder value. Lastly, from a methodological perspective, our work extends the ASY model to analyze net income smoothing within firms.

2. Methodology

Following ASY and Asdrubali & Kim (2004), we propose a comprehensive framework to quantify the contribution of each net income smoothing channel at the firm level. We start from the identity $R = R$ and we add and subtract the following quantities, obtaining:

$$R = R - VA + VA - OIBDA + OIBDA - OIADA + OIADA - EBIT + EBIT - OI + OI - EBT + EBT - NI + NI \quad (1)$$

with:

- Cost of Materials = Revenues (R) – Value added (VA);
- Wages = VA – Operating Income Before Depreciation and Amortization (OIBDA);

- Depreciation & Amortization (D&A) = OIBDA – Operating Income After Depreciation and Amortization (OIADA);
- General and Administrative Expenses (G&A) = OIADA – Earnings before interest and taxes (EBIT);
- Net interests = EBIT – Operating income (OI);
- Extraordinary net costs = OI – Earnings before taxes (EBT);
- Taxes = EBT – Net income (NI).

Applying the one lag difference operator Δ to (1) we get:

$$\Delta R = \Delta R - \Delta VA + \Delta VA - \Delta OIBDA + \Delta OIBDA - \Delta OIADA + \Delta OIADA - \Delta EBIT + \Delta EBIT - \Delta OI + \Delta OI - \Delta EBT + \Delta EBT - \Delta NI + \Delta NI \quad (2)$$

We multiplied both sides of (2) by ΔR and we obtained:

$$\Delta R^2 = (\Delta R - \Delta VA)\cdot\Delta R + (\Delta VA - \Delta OIBDA)\cdot\Delta R + (\Delta OIBDA - \Delta OIADA)\cdot\Delta R + (\Delta OIADA - \Delta EBIT)\cdot\Delta R + (\Delta EBIT - \Delta OI)\cdot\Delta R + (\Delta OI - \Delta EBT)\cdot\Delta R + (\Delta EBT - \Delta NI)\cdot\Delta R + \Delta NI\cdot\Delta R \quad (3)$$

Applying expectations to both sides of (3), as originally in ASY (1996), we have:

$$VAR(\Delta R) = COV(\Delta R,(\Delta R - \Delta VA)) + COV(\Delta R,(\Delta VA - \Delta OIBDA)) + COV(\Delta R,(\Delta OIBDA - \Delta OIADA)) + COV(\Delta R,(\Delta OIBDA - \Delta EBIT)) + COV(\Delta R,(\Delta EBIT - \Delta OI)) + COV(\Delta R,(\Delta OI - \Delta EBT)) + COV(\Delta R,(\Delta EBT - \Delta NI)) + COV(\Delta R,\Delta NI) \quad (4)$$

Dividing both sides of (4) by VAR(ΔR) we finally get:

$$1 = \frac{COV(\Delta R,(\Delta R - \Delta VA))}{VAR(\Delta R)} + \frac{COV(\Delta R,(\Delta VA - \Delta OIBDA))}{VAR(\Delta R)} + \frac{COV(\Delta R,(\Delta OIBDA - \Delta OIADA))}{VAR(\Delta R)} + \frac{COV(\Delta R,(\Delta OIADA - \Delta EBIT))}{VAR(\Delta R)} + \frac{COV(\Delta R,(\Delta EBIT - \Delta OI))}{VAR(\Delta R)} + \frac{COV(\Delta R,(\Delta OI - \Delta EBT))}{VAR(\Delta R)} + \frac{COV(\Delta R,(\Delta EBT - \Delta NI))}{VAR(\Delta R)} + \frac{COV(\Delta R,\Delta NI)}{VAR(\Delta R)} \quad (5)$$

Given that, in general, $COV(X,Y)/VAR(X)$ is the slope a regression, we can rewrite (5) as:

$$1 = \beta_K + \beta_F + \beta_C + \beta_D + \beta_E + \beta_G + \beta_H + \beta_U \quad (6)$$

where β_K, β_F, β_C, β_D, β_E, β_G, β_H are the fractions of 100% sales shock smoothed respectively via Materials (β_K), Wages (β_F), D&A (β_C), G&A (β_D), Net Interests (β_E), Extraordinary Items (β_G), Taxes (β_H). For example, if $\beta_K + \beta_F + \beta_C + \beta_D + \beta_E + \beta_G + \beta_H = 0$ it implies that the 100% sales shock is absorbed by the net income. On the contrary, if $\beta_K + \beta_F + \beta_C + \beta_D + \beta_E + \beta_G + \beta_H = 1$ the net income remains unchanged despite changes in sales because the shock is fully absorbed by the included smoothing channels.

To obtain a measure of smoothing from the identity in (6), for each firm *i* and time *t*, we estimate the following panel model which takes the first differences of all variables:

$$\Delta R_{t,i} - \Delta VA_{t,i} = \alpha_{i,K} + \vartheta_{t,K} + \beta_K \cdot \Delta R_{t,i} + u_{t,i,K} \quad (7a)$$
$$\Delta VA_{t,i} - \Delta OIBDA_{t,i} = \alpha_{i,F} + \vartheta_{t,F} + \beta_F \cdot \Delta R_{t,i} + u_{t,i,F} \quad (7b)$$
$$\Delta OIBDA_{t,i} - \Delta OIADA_{t,i} = \alpha_{i,C} + \vartheta_{t,C} + \beta_C \cdot \Delta R_{t,i} + u_{t,i,C} \quad (7c)$$
$$\Delta OIADA_{t,i} - \Delta EBIT_{t,i} = \alpha_{i,D} + \vartheta_{t,D} + \beta_D \cdot \Delta R_{t,i} + u_{t,i,D} \quad (7d)$$
$$\Delta EBIT_{t,i} - \Delta OI_{t,i} = \alpha_{i,E} + \vartheta_{t,E} + \beta_E \cdot \Delta R_{t,i} + u_{t,i,E} \quad (7e)$$
$$\Delta OI_{t,i} - \Delta EBT_{t,i} = \alpha_{i,G} + \vartheta_{t,G} + \beta_G \cdot \Delta R_{t,i} + u_{t,i,G} \quad (7f)$$
$$\Delta EBT_{t,i} - \Delta NI_{t,i} = \alpha_{i,H} + \vartheta_{t,H} + \beta_H \cdot \Delta R_{t,i} + u_{t,i,H} \quad (7g)$$
$$\Delta NI_{t,i} = \alpha_{i,U} + \vartheta_{t,U} + \beta_U \cdot \Delta R_{t,i} + u_{t,i,U} \quad (7h)$$

within (7), $\alpha_{i,}$ are the firms fixed effects, $\vartheta_{t,}$ are the fixed time effects, and *u* the error terms, with the usual specification.

Our model also extends to dividend smoothing. Considering the intertemporal budget constraint for a firm (Lambrecht & Myers, 2012), represented by:

$$NI + \Delta D = INV + DIV$$

with ΔD the changes in financial debt, INV the investments and DIV the payout to shareholders in dividends (Hoang & Hoxha, 2016), we can extend our model as in (2) and obtaining:

$$\Delta R = \Delta R - \Delta NI + \Delta NI - (\Delta NI + \Delta D) + (\Delta NI + \Delta D) - DIV + DIV \quad (8)$$

and according to the operations made in (3), (4), (5), and (6), we get

$$\Delta R_{t,i} - \Delta NI_{t,i} = \alpha_{i,v} + \vartheta_{t,v} + \beta_v \cdot \Delta R_{t,i} + u_{t,i,v} \quad (9a)$$
$$\Delta NI_{t,i} - (\Delta NI + \Delta D)_{t,i} = \alpha_{i,Z} + \vartheta_{t,Z} + \beta_Z \cdot \Delta R_{t,i} + u_{t,i,Z} \quad (9b)$$
$$(\Delta NI + \Delta D)_{t,i} - \Delta DIV_{t,i} = \alpha_{i,W} + \vartheta_{t,W} + \beta_W \cdot \Delta R_{t,i} + u_{t,i,W} \quad (9c)$$
$$\Delta DIV_{t,i} = \alpha_{i,Y} + \vartheta_{t,Y} + \beta_Y \cdot \Delta R_{t,i} + u_{t,i,Y} \quad (9d)$$

with

$$\beta_v = \beta_K + \beta_F + \beta_C + \beta_D + \beta_E + \beta_G + \beta_H \quad (10a)$$

and

$$1 = \beta_v + \beta_Z + \beta_W + \beta_Y \quad (10b)$$

Finally, to examine if the sign and type (i.e., transitory and permanent) of sales shocks are absorbed similarly or differently by different net income smoothing channels, we categorized our sampled firms based on the nature of sales changes—dividing it into instances of positive sales changes and those experiencing negative sales changes. Furthermore, we differentiated between permanent and transitory shocks (see Appendix A).

3. Results

The sample comprises 2,254,805 European firms from the Bureau van Dijk Amadeus database for which accounting data are available for at least six successive years (i.e., 10% of the total universe). This constraint was necessary to control for excessive heterogeneity caused in our estimates by time series discontinuities, without compromising the representativeness of our sample. For robustness, we adjusted the number of available accounting data years to five. The sample's share of the universe increased to 16%. Our main results remain consistent, although standard errors have increased. The timeframe considered spans from 2003 to 2018, with the firm-year observations amounting to 12,868,021. We excluded more recent years to prevent our results from being conflated with the COVID-19 pandemic period. Data is expressed in real terms, adjusted with the GDP deflator. Descriptive statistics are in Table 1.

Table 1 – Descriptive statistics and partial correlation coefficients

	1	2	3	4	5	6	7	8	9
1. ΔRevenues	1								
2. ΔCost of Materials	.89	1							
3. ΔWages	.55	.35	1						
4. ΔD&A	.01	.01	.01	1					
5. ΔG&A	.37	.04	.24	.01	1				
6. ΔNet Interests	.00	.00	.00	.99	.00	1			
7. ΔExtraordinary Items	.00	-.04	-.06	.00	-.10	-.02	1		
8. ΔTaxes	-.01	-.02	.00	.00	-.02	.00	.00	1	
9. ΔNet income	.04	.05	.05	.00	.35	.01	.19	.40	1
M	*99.08*	*65.38*	*19.33*	*5.60*	*25.70*	*3.78*	*3.99*	*0.43*	*16.29*
sd	*42,874*	*34,470*	*5,930*	*1,392*	*16,717*	*13,939*	*5,006*	*5,535*	*11,000*

Equations in (7) are estimated individually using a fixed effect (FE) panel model. For robustness, the same equations are estimated jointly using a fixed effect panel model with robust standard errors to account for panel regression with cross-sectional dependence (FE robust), as well as Arellano & Bond (1991) Generalized Method of Moments (GMM) estimators. We also calculate lag differences in logarithmic form. The results provide consistent estimate.

3.1 General effects

Applying the ASY variance-decomposition methodology described in (7), Table 2 displays the percentage of sales shocks absorbed by each identified smoothing channel. Materials (63.16%), G&A (17.39%) and Wages (9.03%) contribute most significantly to mitigating the volatility of sales shocks on net income, showing that such a smoothing is accomplished by managers on acting on the firms' real operations whose values are reported within the EBIT. Table 2 provides evidence of a hierarchy among net income smoothing channels.

Table 2 – Percentage of sales shocks transferred at each level of smoothing channel

	Total sample	Heterogeneity				
	FE	FE *Size* L;M;S	FE *Industry* P;M;SM	FE *Group* G;NG	FE *Listed* LI;NL	FE *Year* 1;2;3
Materials	63.16% (11.40)	79%;34%;41%	74%;57%;89%	76%;32%	61%;76%	69%;76%;82%
Wages	9.03% (3.7)	10%;8%;9%	2%;15%;2%	8%;5%	10%;7%	14%;6%;3%
D&A	3.57% (4.35)	1%;1%;5%	5%;5%;2%	3%;2%	7%;1%	2%;4%;2%
G&A	17.39% (4.61)	6%;50%:37%	-1%;23%;8%	13%;54%	21%;12%	9%;18%;14%
Net Interests	1.81% (3.27)	1%;0%;2%	6%;1%;1%	1%;1%	2%;1%	1%;1%;1%
Extraordinary items	1.76% (2.09)	1%;1%;1%	12%;0%;0%	0%;1%	-2%;1%	2%;-1%;0%
Taxes	-0.17% (-.52)	0%;0%;0%	-4%;0%;0%	0%;0%	0%;0%	0%;0%;-1%
Net income	2.71% (1.46)	2%;5%;5%	6%;-1%;-2%	-1%;5%	1%;2%	3%;-4%;-1%
Obs/1000000	10.45	0.75;3.23;6.46	.11;3.45;6.89	4.18;6.27	.01;10.44	2.32;4.64;3.48
Average R2	.66	.58:.44;64	.45;.68;.51	.69:.56	.70:66	.55;.54;.49

Note: robust standard errors are reported in parenthesis. Large firms (L) are those with Operating revenue ≥ 10 million EUR; Total assets ≥ 20 million EUR; Employees ≥ 150; Medium firms (M) are those with Operating revenue ≥ 1 million EUR; Total assets ≥ 2 million EUR; Employees ≥ 15; Small firms (SM) are all companies not included in another category. Firms in primary-mining (M) industry are those with SIC∈[10,14] ∪ [100,149]; Firm in manufacturing (M) industries are those with SIC ∈ [15,17] ∪ [20,39] ∪ [150,179] ∪ [200,399]; Firms in service (S) industries are those with SIC ∈[40,59] ∪ [60,67] ∪ [70,89] ∪ [400,599] ∪ [600,679] ∪ [700,899]. As for the Group variable, firms in a group (G) are those with the total number of firms in the business group greater than zero; otherwise, it is classified as individual firm (NG). As for listed, a company whose stocks are listed in a financial market are considered as listed (L), otherwise private company (NL). As for the year, the period 1 is in 2003-2007; 2 in 2008-2013; 3 in 2014-2018. Number of observations is influenced by the Δ operator that generates a missing value in the first points of our data.

Controlling for various sources of heterogeneity, we observed that although the fraction of sales shocks absorbed by net income remains limited, the hierarchy of smoothing channels shows some variations. These variations concentrate in specific cases (i.e., primary industries). The fraction of sales shocks absorbed by smoothing channels varies more broadly. This latter variation can be attributed to conditions within firms and industries, which influence managers use of net income smoothing channels. Such heterogeneity calls for future studies to explore potential moderating variables influencing the hierarchy of smoothing channels.

4.2 The effect of sign and type of sales shock

Table 3 shows in the case of persistent sales shocks, net income exhibits a de-smoothing effect. It implies that as the magnitude of the sales shock increases (decreases), net income moves in the opposite direction, showing a decrease (increase) in its variation. Moreover, in the case of a persistent shock in sales, G&A absorbs a large portion of this variation. Regarding the shock sign, Materials absorption of sales shocks is relatively symmetrical, while the absorption of Wages and G&A is skewed positively. Moreover, given the limited and

symmetrical transfer of positive and negative sales shocks to net income, firms concurrently establish an opportunity cost for shareholders from not utilizing upside sales shocks.

Table 3 – Percentage of sales shocks transferred at each level of smoothing channel: sign of shock

	Total sample		Total sample		Persistent		Transitory	
	Negative sales shock	Positive sales shock	Persi-stent	Tran-sitory	Negative sales shock	Positive sales shock	Negative sales shock	Positive sales shock
Materials	74.96% (.081)	73.21% (.072)	62.54% (.049)	76.58% (.055)	81.28% (.044)	59.21% (.030)	74.53% (.087)	78.73% (.067)
Wages	6.74% (.033)	8.66% (.031)	12.16% (.022)	6.81% (.025)	4.41% (.015)	13.54% (.015)	6.89% (.035)	6.73% (.036)
D&A	2.29% (.007)	4.34% (.018)	8.01% (.022)	2.39% (.007)	0.57% (.005)	9.30% (.015)	2.41% (.008)	2.37% (.011)
G&A	10.26% (.048)	18.78% (.062)	30.22% (.064)	11.55% (.034)	8.26% (.028)	34.12% (.044)	10.40% (.054)	12.73% (.042)
Net Interests	0.76% (.006)	1.37% (.008)	3.43% (.007)	0.56% (.004)	1.46% (.011)	3.81% (.005)	0.71% (.006)	0.40% (.006)
Extraordinary items	2.33% (.011)	-1.72% (.011)	-3.85% (.015)	.96% (.007)	0.61% (.003)	-4.65% (.011)	2.44% (.012)	-0.56% (.009)
Taxes	-0.01% (.004)	-0.29% (.005)	-0.87% (.011)	0.00% (.003)	-0.12% (.005)	-1.00% (.013)	0.02% (.005)	-0.01% (.004)
Net income	2.62% (.012)	-4.34% (.036)	-11.64% (.042)	1.10% (.014)	3.51% (.022)	-14.35% (.028)	2.55% (.013)	-0.40% (.027)
Obs	5.598.260	4,856,798	1,754,913	8,710,395	1,045,139	701,259	4,550,383	4,153,240
Average R2	.65	.66	.78	.67	.66	.54	.65	.57

Note: robust standard errors are reported in parenthesis.

4.3. The combined effect of sign and type of sales shock

Table 3 provides evidence of the moderating role of shock persistency on the symmetry in sales shocks absorption by net income smoothing channels. Indeed, in the presence of persistently positive shocks, the firm introduces volatility to channels associated by retaining resources internally and utilizing Wages and G&A smoothing channels more than in the case of transitory shocks. As a result, we suspect that during persistently positive shocks phases, firms transfer volatility by augmenting their G&A expenses with resources to fund current growth and establish "hidden reserves" to manage future downturns. Finally, we observed that the de-smoothing of net income stems from persistent-positive sales shocks. This observation further underscores our belief that income smoothing imposes an opportunity cost on shareholders, who receive a stable income flow but encounter limitations in capturing the upside potential of sales shocks.

4.4. From income smoothing to dividend smoothing

In our sample, the portion of sales shock smoothed by net income smoothing channels amounts to 97.29%, with debt and investment absorbing 1.54% and 1.10%, respectively. The unsmoothed component absorbed by the payout stands at 0.06%. These results, in comparison to net income smoothing channels, display consistency across positive or negative, persistent or transitory sales shocks.

5. Concluding remarks

We expanded the ASY model to the firm level, developed a comprehensive framework and presented evidence that net income absorption of sales shocks is relatively limited across various firms and industries. We identified distinct net income smoothing channels and confirmed the constrained variability of net income and corporate payout (Hoang & Hoxha, 2016; Balli et al., 2022). This outcome is achieved mainly through net income smoothing channels, with debt and investments playing a minor role.

This analysis elucidates a stratified picture of net income channels, delineating a hierarchy in their relevance to the firm's economic structure. The channels identified as most pivotal include Materials, General & Administrative (G&A) expenses, and Wages. We argue that this hierarchy signifies a nuanced risk transfer mechanism between the firm and its key stakeholders, where each channel corresponds to a distinct stakeholder group: Materials to suppliers, Wages to employees, G&A to the firm's internal operations, Net Interests to creditors, and Taxes to governmental authorities. The observed channels hierarchy will be influenced by two primary factors: the managerial flexibility in modifying payment flows within each channel, and the willingness of stakeholders to absorb transferred sales shocks without imposing significant constraints on managerial decisions or future firm-stakeholder interactions. This flexibility and willingness are contingent upon the firm's contractual arrangements and the inherent negotiability within each channel. Furthermore, we suggest that this hierarchical structure of net income channels and the associated risk transfer mechanisms have profound implications for the management of inter-firm relationships and stakeholder engagement. Specifically, understanding the dynamics of this hierarchy can offer valuable insights into the strategic management of shareholder/stakeholder interests, potentially affecting the firm's cost of capital and the systemic risk propagated through production chains and stakeholder networks. This study advances the discourse on financial risk management by highlighting the strategic importance of managing net income channels not only as financial figures but as integral elements of broader stakeholder engagement and risk-sharing practices.

Our findings concerning the sign and type of sales shocks indicate that firms symmetrically transfer volatility via different net income smoothing channels to limit the potential that in reneging its contractual obligations the firm is making the other party to suffer losses on its relationship-specific assets, creating an incentive on the part to sub-optimally invest in the relationship. The considered symmetrical volatility transfer

induces also an opportunity cost for shareholders by not capitalizing on upside risk, in line to safeguard their wealth. Our analysis of shock types also delineates that positive, persistent shocks predominantly internalize volatility through G&A (General and Administrative) expenditures, while negative, persistent shocks externalize volatility, chiefly affecting Materials expenses. This observation underscores a nuanced mechanism of variance absorption within firms, contingent upon the nature of the external shocks. Specifically, in response to positive sales shifts, firms appear to strategically augment their G&A expenditures, thereby internalizing the variance. This expansion of G&A presumably aims to leverage the favorable market conditions to bolster sales adequately. Conversely, in the face of declining sales, firms exhibit a reluctance to proportionally reduce G&A expenses, opting instead to maintain these operational capacities. This persistent utilization of G&A, despite reduced sales, may reflect managerial anticipation of future opportunities to redeploy these resources, thereby neutralizing the impact of negative incentives induced on suppliers to commit to specific investments in their relationship with the firm. Such a pattern could be influenced by a managerial pursuit of private benefits, suggesting that strategic decisions regarding resource allocation may not be solely driven by immediate operational demands but are also shaped by personal managerial incentives.

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Appendix A – Test for sales shocks' persistency (written in STATA)

To measure the persistence of a shock in sales, we cannot rely on the timeseries properties of individual firms' sale growth, as the number of time periods per firm is too low in our sample (around four, as an average). We then resort to the non-parametric test of runs, which can be used to check whether positive and negative sales shocks occur randomly or not, for each firm. In other words, we use this test to identify whether a given firm was prevalently hit by permanent or transitory shocks along its sample horizon, rather than identifying whether a given shock was transitory or permanent. In fact, we use an adjusted version of this test, where the possibility of a negative correlation between shocks is ruled out, and only positive correlation, in the form of sequences of shocks with the same sign is retained, as identifying permanent shocks. In practice, if the number of runs (sequences of shocks with the same sign) is greater than half the number of observations, we identify the shocks in the sequence as transitory. The test is conducted at the 10% level of significance. By this test we compute the dummy variable "permanent", taking value 1 (for all sample years) if the firm is recognized to be hit by permanent shocks.

The test is programmed in STATA and code is here provided.

```
global significativita = 0.15
global Tmin=3
```

```
use [\file name], clear
set more off

keep if id<=1000
tsset id year
xtdes
sort year id
bysort year: gen id2=[_n]
gen spia=1 if ds1r!=.
bysort id: egen T=sum(spia)
drop if T<${Tmin}
drop spia
local i = 1
display [_N]
while `i'<=[_N]{
display `i'
sort id2 year
gen d=id2-id2[_n-1]
bysort id: egen d2=max(d)
replace id2=id2-(d2-1) if d2>1
drop d d2
drop if ds1r==.
local i = `i' + 1}
save dtot, replace
set more off
use dtot, clear
egen maxid=max(id2)
local max = maxid
drop maxid
gen s=${significativita}
local i = 1
display `max'
while `i'<=`max'{
preserve
keep if id2==`i' & ds1r!=.
runtest ds1r, cont threshold(0)
gen persist=`r(p)'<s|`r(n_runs)'<2
replace persist=0 if `r(n_runs)'>`r(N)'/2
replace persist=0 if `r(n_runs)'<2 & `r(N)'==2
gen runs=`r(n_runs)'
gen nobs=`r(N)'
save d_`i', replace
local i = `i' + 1
restore
}
drop id2  T s
local i = 2
use d_1, clear
while `i'<=`max'{
append using d_`i'
erase d_`i'.dta
local i = `i' + 1
}
order id year dummy ds1r
sort id year
```