i.e. *GlaxoSmithKline*, *Sanofi-Aventis* and *AstraZeneca*, already contributed 110 billion US$ of sales in 2008 (see figure 2) despite the fact that none of them had participated in the latest wave of mega mergers and acquisitions.[91]

| Top-50 Ranking | Group Name | Global Pharma Sales 2008 (US$ bn) | Global R&D Spend 2008 (US$ bn / % of sales) | | Tier |
|---|---|---|---|---|---|
| 2 | GlaxoSmithKline | 43,0 | 5,2 | 12,1% | |
| 3 | Sanofi-Aventis | 38,7 | 6,5 | 16,8% | 1 |
| 5 | AstraZeneca | 31,6 | 5,1 | 16,1% | |
| 13 | Bayer | 15,1 | 2,5 | 16,6% | 2 |
| 16 | Boehringer Ingelheim | 13,6 | 2,9 | 21,3% | |
| 22 | Novo Nordisk | 8,6 | 1,5 | 17,4% | 3 |
| 23 | Merck KGaA | 7,6 | 1,5 | 19,7% | |
| 27 | Servier | 5,2 | n/a | n/a | |
| 30 | UCB | 4,3 | 1,1 | 25,6% | |
| 32 | Solvay | 3,8 | 0,6 | 15,8% | |
| 33 | Ratiopharm | 3,7 | n/a | n/a | 4 |
| 41 | Menarini | 3,1 | 0,3 | 9,7% | |
| 43 | Shire | 2,8 | 0,5 | 17,9% | |
| 45 | Lundbeck | 2,1 | 0,6 | 28,6% | |
| | | | | | |
| TOTAL | | **183,2** | **28,3** | 15,4% | |

**Figure 2:**
**European Pharmaceutical Companies amongst the Global Top-50 Ranking 2008[92]**

### *3.1.2. Originator Pharmaceutical Companies*

Except for Germany's *Ratiopharm*, which was acquired by *Teva Pharmaceuticals* in 2010, all European pharmaceutical companies amongst the largest global 50 can be considered 'originators': They invest a substantial part of their revenues, on average over 15% (see figure 2), into R&D with the objective to discover, develop and commercialize innovative pharmaceutical products. In this effort, originators historically have focused on 'blockbuster' products in high prevalence disease areas with potential annual sales beyond 1 billion € in order to recoup their high investments and generate the expected profit level.[93]

For originators, profitability needs to be sufficiently high to fund R&D investments for both, drug candidates reaching the market as well as the much

91 In this recent wave, Pfizer acquired Wyeth, Novartis acquired Alcon, Merck & Co. acquired Schering-Plough and Roche gained majority control over Genentech. See PharmExec Staff, The PharmExec 50, 5 Pharmaceutical Executive 68, 70-78 (2009).
92 Own illustration; data sourced from Id. at pp. 70-78.
93 See supra note 10 at pp. 27-28.

higher number of unsuccessful R&D projects, which have to be terminated before or during clinical trials due to safety and/or efficacy issues.[94] The fact that significantly more drug development candidates are abandoned than successful in turn requires higher profit contributions from those remaining successful drugs which meet the regulatory hurdles established to ensure patient safety. In case regulatory authorities also limit prices and thus the basis for those higher profits,[95] originator companies run the risk of getting 'squeezed'. Consequently, generic defense strategies are an important component of an originator's business model, as it allows to appropriate incremental returns from products launched on the market.

Pressure on profitability is even greater as originators also need to compensate demanding shareholders: Capital markets theory regards shareholders as residual claimants, who are only compensated after all other claims (e.g. wages of employees or interest payments for debt holders) have been satisfied by the company. Shareholders therefore demand returns for their provided capital adequately considering the inherent high risk and volatility of an originator's business model (figure 3 demonstrates the volatility of returns of individual originators).[96] In other words: Even after the consideration of R&D expenses, originator business models per definition need to generate profit levels significantly above those of other industry sectors in order to attract and retain capital. Otherwise, investors would pursue alternative opportunities with a lower risk profile and similar returns. As figure 3 shows, some European originators achieved returns on invested capital (ROIC) between 30-40% in 2005-2007, while average performers lie between 15-25%.

94 See supra note 4 at p. 432.

95 Such measures have been frequently adopted across many EU member states, e.g. by introducing price caps on pharmaceutical products (also see chapter 2.1.1.).

96 See Stephen A. Ross et al., Corporate Finance 391 (6th int. ed., McGraw-Hill Higher Education 2002) (1988).

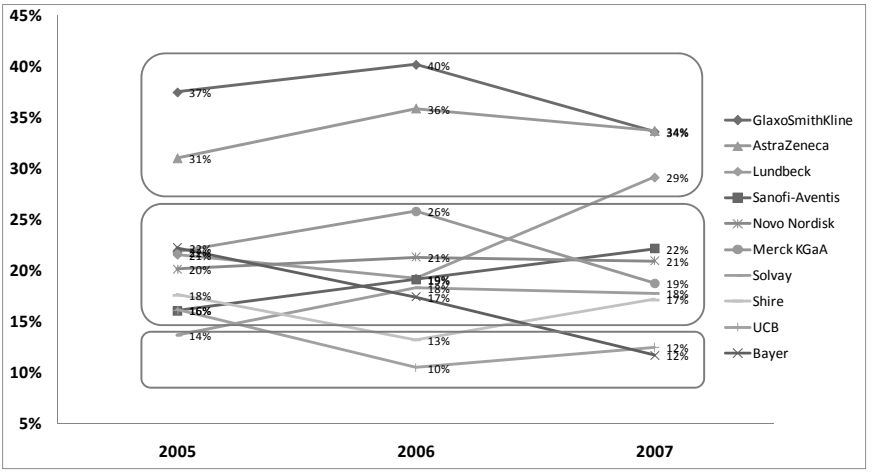


**Figure 3:**
**ROIC 2005-2007 of publicly listed European originator companies amongst the Global Top-50[97]**

### *3.1.3. Generic Pharmaceutical Companies*

Besides the traditional originators, generic companies have emerged, which pursue a substantially different business model: Their objective is to 'imitate' established or mature products, i.e. drugs which have already been marketed by originator companies over a long period of time and have or will be soon subject to LOE.[98] Thereby, generic companies 'take over' the (manufacturing and) commercialization of such products in the most cost efficient way and thus ensure certain stability in supplying these products to patients.[99]

In contrast to counterfeits, which are illegal copies not subject to any quality control,[100] generic pharmaceuticals are legitimate copies subject to rigid regulatory approval processes. By proving bioequivalence vis-à-vis the originator's reference drug, generics are allowed to rely on the clinical

97 Data provided by Accenture Management Consulting research; invested capital used to compute ROIC does not consider capitalized goodwill; company selection based on supra note 91 at pp. 70-78 (only publicly listed companies considered).
98 See supra note 1.
99 See supra note 78 at p. 4.
100 On this confusion, see Kevin Outterson, Counterfeit drugs: the good, the bad and the ugly, 16 Alb. L.J. Sci. & Tech. 526 (2006).