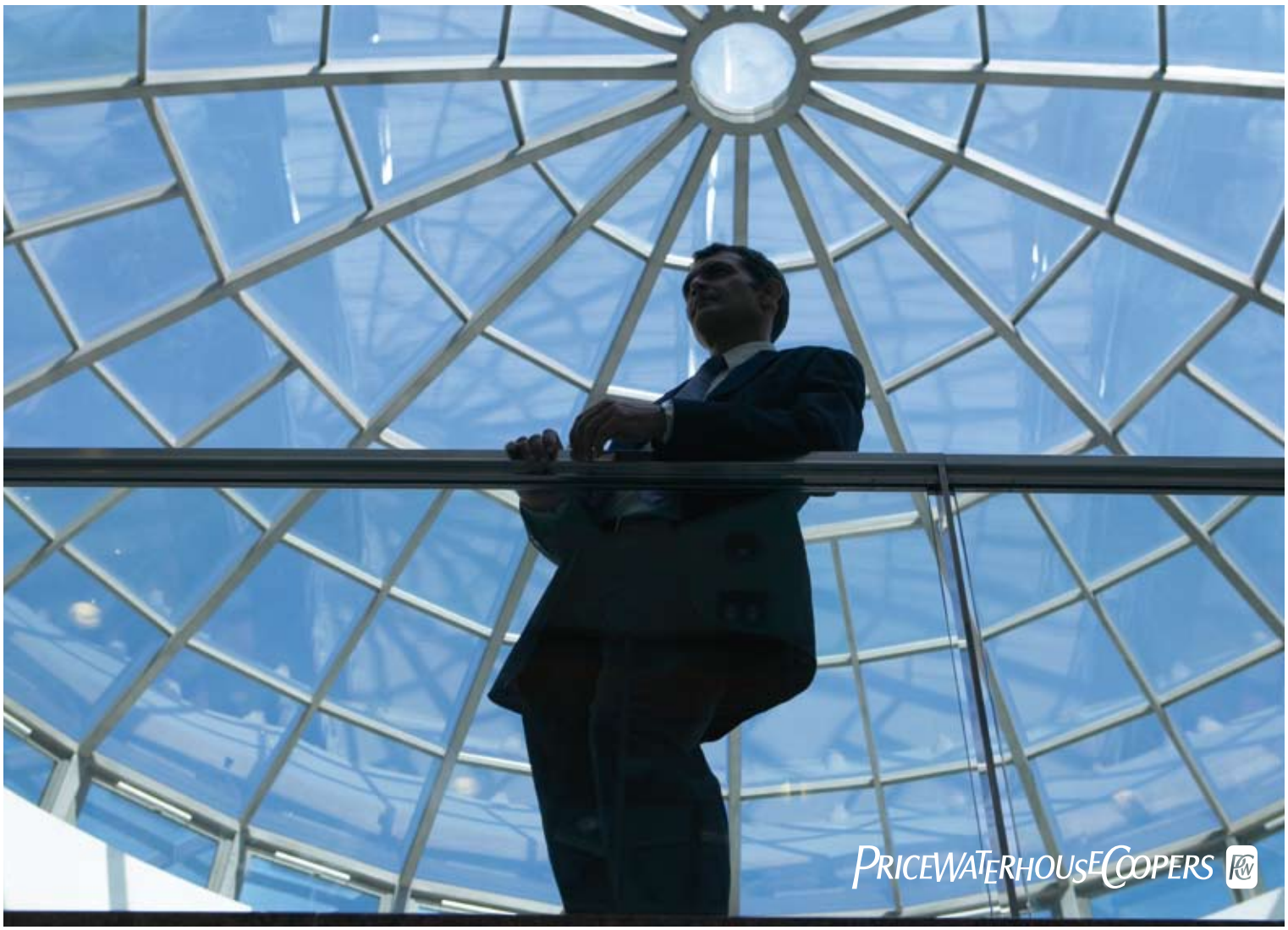
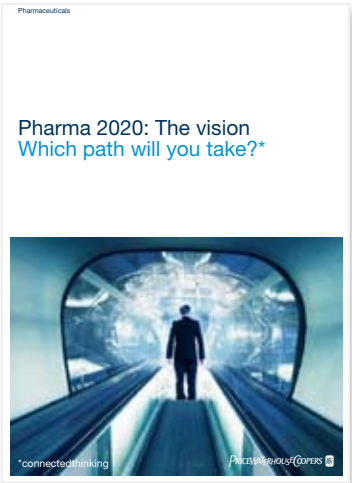
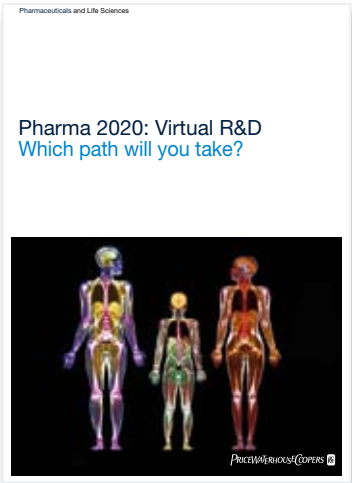
Pharma 2020: Taxing times ahead
Which path will you take?



Previous publications in this series include:

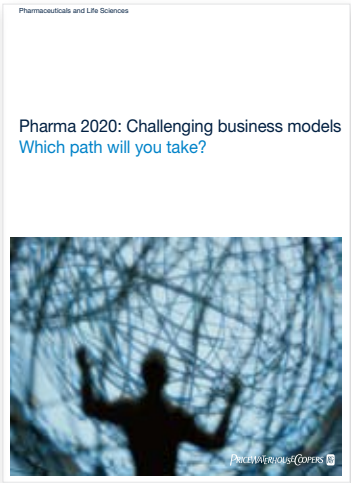


The founding paper in this series, "Pharma 2020: The vision", launched in June 2007, highlights a number of issues that will have a major bearing on the industry and outlines the changes we believe will help pharmaceutical companies enhance the value they provide to shareholders and society in the future.



The second paper, "Pharma 2020: Virtual R&D", launched in June 2008, explores how pharmaceutical companies can dramatically improve the R&D process. We argue that new technologies will enable them to virtualise large parts of their R&D, while working more closely with researchers, governments, healthcare payers and providers will enable them to address the changing needs of society more effectively.

Published in February 2009, "Pharma 2020: Marketing the future", discusses the key forces reshaping the pharmaceutical marketplace – including the growing power of healthcare payers, providers and patients – and the changes required to create a marketing and sales model fit for the 21st century. These changes will enable the industry to market and sell its products more cost-effectively, to create new opportunities and to generate greater customer loyalty across the healthcare spectrum.



"Pharma 2020: Challenging business models", published in April 2009, highlights the need for a more collaborative approach to the research, development and delivery of medicines. It also evaluates the advantages and disadvantages of various business models and how each stands up against the challenges facing the industry.

"Pharma 2020: Taxing times ahead" – the fifth report in our series of white papers on the future of the pharmaceutical and life sciences industry – focuses on the opportunities and challenges from a tax perspective. It discusses how the political, economic, scientific and social trends currently shaping the commercial environment, together with the development of new, more collaborative business models, will exert increasing pressure on effective tax rates within the industry. It also shows how companies can adapt their tax strategies to support the provision of outcomes-based healthcare and remain competitive.

All these publications are available to download at: www.pwc.com/pharma2020

Table of contents

Introduction

We discussed many of the far-reaching changes influencing the pharmaceutical and life sciences industry (Pharma) as it approaches the second decade of the new millennium in the previous four papers in the PricewaterhouseCoopers' Pharma 2020 series. Our latest report focuses on the resulting opportunities and challenges from a tax perspective. It builds on the fourth paper in the series, "Pharma 2020: Challenging business models", in which we argued that many companies will have to adopt a more collaborative approach.[1]

Most Big Pharma companies have traditionally done everything from research and development (R&D) through to commercialisation themselves. But we believe that this model will alter over the next 10 years. If such companies are to prosper, they will need to improve their R&D productivity, reduce their costs, expand their presence in the emerging markets, switch from selling medicines to managing outcomes and embrace the changes taking place in the broader healthcare arena – activities that will require them to take one of two routes. They will either have to collaborate with a wide range of organisations, including academic institutions, hospitals, technology vendors and firms offering compliance programmes, health screening, physiotherapy, exercise facilities and the like, or become fully diversified conglomerates capable of providing such services themselves.

These changes, together with the political and economic trends now shaping the general commercial environment, will have major repercussions on the way in which Pharma is taxed. We anticipate that:

- The corporate tax burden will rise significantly over the next 10 years, as the governments of the industrialised world struggle to repair public finances deeply damaged by the debts they have accrued in managing the global recession.
- Many governments will clamp down on the opportunities for minimising corporate taxes by shifting profits from countries with higher tax rates to countries with lower tax rates. By 2020, all multinationals will be subject to much more stringent tax regulations, and the major powers could impose trading restrictions on any traditional tax havens that still refuse to cooperate.
- The tax authorities in most countries will also work more closely with their counterparties in other territories, reducing the ability to use hybrid instruments and entities in cross-border transactions.
- Despite the need to replenish depleted public coffers, the competition to attract companies engaging in R&D will intensify. Some countries will offer generous tax incentives and credits – and several will be new competitors keen to build knowledge-based economies.
- Even so, the effective tax rates (ETRs) of most large pharmaceutical companies will rise, as their product portfolios become more specialised and they start offering healthcare packages that comprise medicines and supporting services – unless they actively pursue various strategies to mitigate the impact.[2]

For all these reasons, we think that pharmaceutical tax executives will have to play a much more strategic role in the future. The industry will need tax professionals who are not only versed in international tax law and transfer pricing, but who also understand the broader business issues – people who can help top management structure its operations to support new ways of working.

In the next chapter, we shall examine the main political and economic trends shaping the taxation of Pharma over the next decade. (Our analysis excludes labour taxes, which will be covered in a future paper in the Pharma 2020 series.) Thereafter, we shall look at the effect of the scientific, structural and social changes taking place, including the way in which healthcare delivery is evolving (see **Figure 1**). We shall also explore the implications of using more collaborative business models and the key issues to be considered for the purposes of tax planning.

Figure 1: The key trends driving change in Pharma

Trends

Political & economic trends	Market trends	Health & healthcare trends	Geographic trends
• The governments of the industrialised world will have to reduce their massive deficits. They will target many of the practices multinationals use to defer taxation or shift income to lower-tax jurisdictions • The competition to attract corporate capital will increase, and the emerging countries will play a bigger role in this battle as they try to build knowledge-based economies	• Numerous blockbusters are going off patent • Pharma's focus is shifting to specialist medicines • The emerging markets are becoming increasingly attractive places in which to do business	• Demand for personalised medicine is increasing • Healthcare bills are soaring • Healthcare payers & providers are placing ever greater emphasis on wellness & prevention • Some payers are also piloting value-based purchasing, where payment for treatment is contingent on outcomes	• A growing amount of R&D is being performed in Asia and other emerging areas • The supply chain is becoming more complex and more geographically dispersed

Implications

Tax incentives will become more critical if Pharma is to sustain its profitability	Pharma will target new areas of growth	Pharma will go "beyond the medicine" to focus on outcomes	Pharma's operations will become more complex
• Corporate taxes could rise • Generous tax incentives and low corporate tax rates will become increasingly important factors in decisions about where to locate business activities	• Pharma will engage in more mergers, acquisitions and in-licensing arrangements to replenish its pipeline • Pharma will expand its presence in the emerging markets. Its sources of revenue and profit will shift accordingly	• Pharma will offer packages of products and services, but products and services are often taxed differently • Pharma will collaborate with multiple service providers and enter into profit-sharing agreements that have complex tax ramifications • Pharma will perform more activities in its end markets, many of which are in higher-tax jurisdictions, to provide services directly to patients • Locating service provision in multiple markets could trigger "permanent establishment" issues	• Pharma will perform more business activities in emerging countries, some of which may have less developed tax regimes. • Pharma will form more partnerships and alliances with payers and companies in other sectors. • Pharma will outsource much of its high-volume, low-profit manufacturing capacity in lower-tax locations and concentrate on the production of specialised medicines.

More complex global tax arrangements & higher effective tax rates

Source: PricewaterhouseCoopers

Political and economic factors shaping the future taxation of Pharma

Soaring public deficits

The global recession of the past two years has sent budget deficits soaring, with the governments of the industrialised world borrowing heavily to pump cash into faltering economies. The US has earmarked more than US$12 trillion for its economic bailout,[3] while the European Union (EU) has committed $4 trillion.[4]

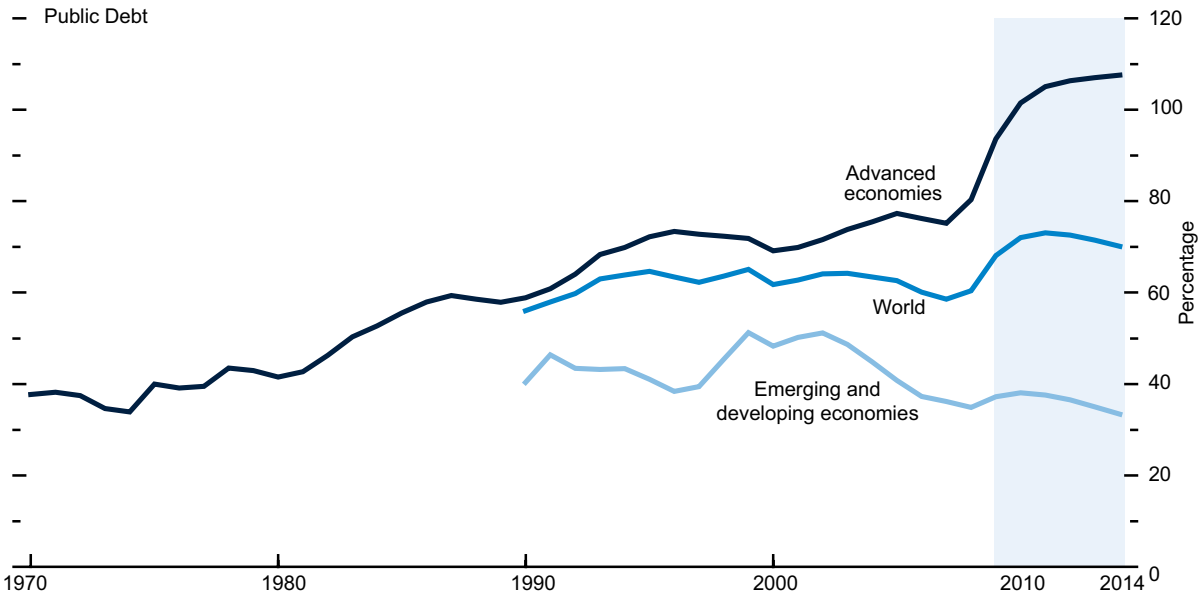
The International Monetary Fund predicts that, if this pattern continues, the level of public debt in the 20 leading economies (the G-20) could rise from about 75% of gross domestic product (GDP) in 2008 to almost 110% by 2014 (see **Figure 2**). Should the situation deteriorate, the level of debt could reach an even more eye-watering 140% over the same period.[5]

But whether or not the recession ends relatively rapidly, one thing is clear: many governments will be forced to raise taxes and cut public spending, including expenditure on infrastructure projects and R&D. They will almost certainly begin the first of these two tasks by focusing on companies and industries that have enjoyed relatively low rates of taxation.

Multinational corporations – and many pharmaceutical companies fall into this category – are one obvious target. Multinationals commonly operate in many different jurisdictions, including locations with low taxes. That, in turn, reduces their global tax bills, and the overall effect of such arrangements can be substantial. According to a report recently published by the US Government Accountability Office, US-based multinationals paid an average US ETR of just 4% on the foreign-source income they earned in 2004 – less than one-sixth of the 25.2% they paid on domestic income.[6]

The comparison is an imperfect one because it excludes the impact of the foreign taxes these multinationals paid on their foreign-source income. However, it helps to explain why President Barack Obama was initially so keen to change the tax regime. In May 2009, he announced several proposals to reform "a tax code full of corporate

Figure 2: The projected level of public debt as a percentage of GDP



Source: International Monetary Fund, "World Economic Outlook", April 2009

loopholes" and generate an estimated $200 billion in new taxes.[7] He was forced to shelve his plans in October 2009, after extensive lobbying from the business community. But aides say that the administration may include some of the measures he outlined in a broader overhaul of the tax regime sometime in 2010.[8]

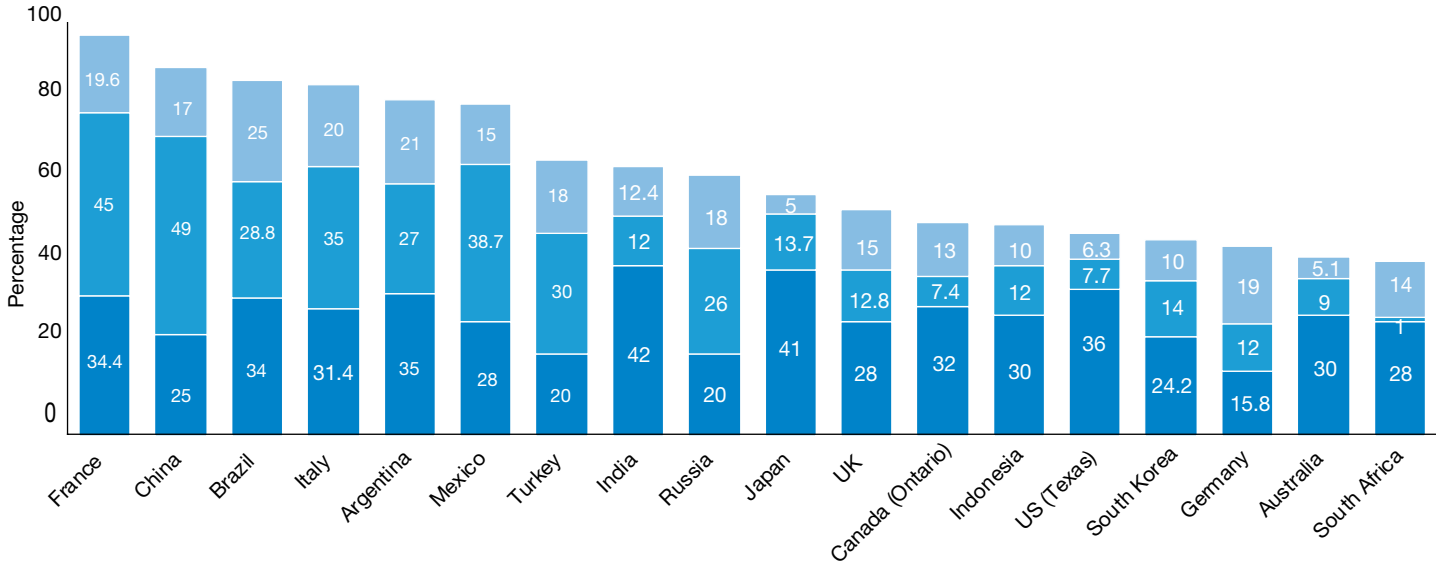
Moreover, the US is by no means alone in wanting to close "corporate loopholes". During its 2009 summit in London, the G-20 pledged to crack down on tax havens as part of its global plan for recovery and reform. The Organisation for Economic Co-Operation and Development (OECD) has now created a blacklist of non-cooperative jurisdictions. It has also created a "grey list" of countries that have agreed to adopt more transparent standards but have not yet signed the necessary international accords.[9]

Meanwhile, several international charities, including Christian Aid, are pushing for the introduction of country-by-country reporting – where companies would be required to publish country-specific information on their corporate income, assets, investments, profits and taxes, rather than consolidating the data in a single global or regional figure. These charities argue that country-by-country reporting would expose any multinationals that are using tax havens and enable the governments of emerging countries to identify the taxes they are fairly owed.[10] British Prime Minister Gordon Brown and French President Nicolas Sarkozy have also backed the initiative, with a joint declaration calling "on the OECD to look at country-by-country reporting and the benefits…for tax transparency and reducing tax avoidance".[11]

Of course, any government that tries to generate additional revenues by taxing multinationals – or, indeed, the people who lead them – more heavily must be careful to ensure that it does not preclude such companies from competing on an equal footing in the global marketplace. Corporate income tax rates are already considerably higher in India, Japan, the US and Argentina than they are in many of the other G-20 countries, although employer social security costs and consumption taxes must also be factored into the equation (see **Figure 3**).[12]

All governments must likewise ensure that they do not trigger a mass exodus

Figure 3: The highest marginal percentages at which different corporate taxes are charged in 18 of the G-20 countries, 2009



Source: *The Forbes Magazine* 2009 Tax Misery and Reform Index

Note: The chart shows the highest marginal percentage at which each tax is charged in each locale. The countries on the left of the chart have the harshest tax regimes, while those on the right are the most tax-friendly.

to more favourable tax jurisdictions. Companies sometimes use the threat of relocating as a bargaining tool, but this is not always idle talk. A number of companies in various industries have already relocated to other countries, specifically to protect or improve their tax positions. British Chancellor of the Exchequer Alistair Darling's recent decision to tax high earners more heavily by raising the top rate of personal income tax to 50% – one of the highest in the G-20 – has elicited similar warnings of a "brain drain".[13]

Nevertheless, we believe that, by 2020, many countries will have higher corporate tax rates and they will expect multinationals to foot a larger share of the bill. Given the dire state of their public finances, it is hard to see how the industrialised economies – and, indeed, some of the emerging economies – will have any other choice.

Variations in effective tax rates

A number of pharmaceutical companies could prove especially vulnerable. A study recently conducted by the US Congressional Budget Office (CBO) shows that, between 2000 and 2006, Pharma's average ETR was lower than that of all but two other sectors (see **Figure 4**). The CBO warned that "all other things being equal, a substantial increase in the industry's tax burden might slow growth in this investment by raising the industry's cost of capital and reducing its cash flow".[14] However, our research suggests that some companies could still be singled out for higher taxation.

We have calculated five-year average ETRs for the top companies in the pharmaceutical, biotechnology, generics and medical device sub-sectors. (We have classified any companies that operate in more than one sub-sector according to their biggest source of revenue.) Our analysis shows that there are some substantial differences both between companies in different sub-sectors and between companies in the same sub-sector (see **Figure 5**). Some of these variations are attributable to the home countries in which individual companies are based, the precise nature of their activities and their

Figure 4: Average effective tax rates for the pharmaceutical industry and other major US industries, 2001-2006 (percent)

Industry	2001	2002	2003	2004	2005	2006	Average Rates for 2001-2006
Mining	33.0	34.0	33.0	35.0	35.0	33.0	34.0
Finance, Insurance & Real Estate	34.0	33.0	33.5	33.0	33.0	34.0	33.5
Manufacturing	32.0	33.0	32.0	33.0	33.0	33.0	33.0
Wholesale & Retail Trade	33.0	33.0	33.0	33.0	33.0	33.5	33.0
Services	32.0	33.0	32.0	33.0	33.0	32.0	32.5
Construction	31.0	32.0	32.0	32.0	33.0	32.0	32.0
Information	31.5	30.0	32.0	33.0	34.0	35.0	32.0
Pharmaceuticals	32.0	31.0	30.0	31.0	32.5	32.5	31.5
Transportation, Warehousing & Utilities	32.0	31.0	29.0	32.0	31.0	31.5	31.0
Agriculture, Forestry, Fishing & Hunting	28.0	27.0	29.0	30.0	30.0	29.0	29.0

Source: Congressional Research Service

Notes: The average ETR for an industry is the ratio of its federal income tax liability after all tax credits, except the foreign tax credit, to its worldwide taxable income, expressed as a percentage.
Pharmaceuticals includes manufacturers of generic and biologic drugs.

Figure 5: Effective tax rates in the top pharmaceutical, biotech, generics and medical device companies

Big Pharma

Company	Location	ETR (%)[1]
Bayer	DE	29.30
GlaxoSmithKline	UK	29.27
AstraZeneca	UK	28.21
Wyeth (pre-merger)	US	26.26
Roche	CH	25.83
Schering-Plough (pre-merger)[2]	US	25.80
Johnson & Johnson	US	25.02
Bristol-Myers Squibb	US	24.24
Merck (pre-merger)[3]	US	23.24
Pfizer (pre-merger)	US	18.21
sanofi-aventis	FR	15.91
Novartis	CH	14.44
Average		23.81

Top 10 Biotech Companies

Company	Location	ETR (%)[1]
Cephalon	US	39.19
Genentech (pre-merger)	US	36.87
Biogen Idec	US	31.60
Genzyme	US	30.00
Gilead Sciences	US	29.20
UCB	BE	27.87
CSL	AU	26.38
Amgen	US	24.34
Celgene	US	24.00
Actelion	CH	12.26
Average		28.17

Top 10 Generics Companies

Company	Location	ETR (%)[1]
Goldshield Group	UK	138.52
Towa Pharmaceutical	JP	42.44
Sawai Pharmaceutical	JP	39.31
Mylan	US	37.80
Watson Pharmaceuticals	US	35.93
Nichi-iko Pharmaceutical	JP	33.96
Teva Pharmaceuticals	IL	24.69
Pharco Pharmaceuticals	EG	12.61
Dr. Reddy's Laboratories	IN	5.53
EastPharma[4]	TR	0.00
Average		37.08

Top 10 Medical Device Companies

Company	Location	ETR (%)[1]
Cardinal Health	US	33.30
Stryker	US	30.50
Covidien	BM	30.00
Boston Scientific	US	29.22
Becton, Dickinson & Co.	US	27.57
Siemens[5]	DE	24.86
Medtronic	US	24.28
Baxter International	US	20.32
Philips[5]	NL	19.06
General Electric[5]	US	14.85
Average		25.40

Source: Annual reports and PricewaterhouseCoopers analysis.

Notes: (1). We have calculated the average ETR for each company using the annual ETR for the five most recent years. We have excluded any year in which a company has made pre-tax losses from our calculations. (2). Schering-Plough's ETR reflects the imposition of a valuation allowance on its tax assets. (3). Merck's ETR reflects the impact of a one-time gain in 2008. (4). EastPharma was established in August 2006 and has made a pre-tax loss in each subsequent year. (5). The ETRs for Siemens, Philips and General Electric are those reported in the consolidated accounts for each group.

geographical spread. But the big picture also reveals several features that cannot be so easily explained.

First, companies in the biotech and generics manufacturing sub-sectors typically have significantly higher ETRs than those in the pharmaceutical and medical device sub-sectors. Nine of the top 20 biotech and generics companies have average ETRs of more than 30%, a rate matched by only two medical device firms and not one pharmaceutical concern. Yet biotech companies also engage in extensive R&D and are therefore generally eligible for the same sort of R&D tax credits Big Pharma can claim.

Second, there are significant differences between companies operating in the same home country and sub-sector. The variation is especially marked in the biotech sub-sector; seven of the top 10 companies are based in the US, but their average ETRs range from 24% to nearly 39.2%, a span of 15.2 percentage points.

In short, governments urgently in need of additional tax revenues may conclude that some sub-sectors are shouldering a smaller share of the burden than others. And they may pursue companies in such sub-sectors – particularly those that appear to be paying much lower taxes than their peers – more vigorously.

The prospect of "green" taxes

The "Green" agenda could add to these pressures. The EU introduced a carbon trading scheme some years ago. It has also undertaken to reduce its greenhouse gas emissions by 20%, to improve its energy efficiency by 20% and to ensure that 20% of its energy consumption comes from renewable sources, all by 2020. The US is currently exploring various options, including a carbon tax; the UK recently set legally binding targets for the reduction of carbon emissions, to be measured on a four-year budgetary cycle; and several emerging economies have been equally proactive.[15]

However, two other issues could have an even bigger impact on the sector. The rules governing the use of chemicals are becoming much more stringent. In July 2007, for example, the EU launched a new set of regulations on the registration, evaluation, authorisation and restriction of chemicals (REACH).[16] There is also a growing body of opinion that the industry should be held accountable for the indirect environmental effects of its products. Residual traces of hormones and other medicines have been detected in drinking water supplies throughout the world.[17] Some governments might respond by taxing pharmaceutical manufacturers to fund the development of more effective wastewater treatments.

Competing tax incentives

That said, greater competition for companies engaging in R&D and manufacturing might help Pharma to mitigate the effect of higher tax rates and new forms of taxation. R&D is widely recognised as one of the main engines of economic growth because it creates not only jobs but also intellectual property that can generate long-term income streams and tax revenues. And here Pharma holds some very powerful cards. The industry spent an estimated $75 billion on R&D in 2008,[18] and an increasing number of countries are vying for a slice of this business.

President Obama recently vowed to lift spending on scientific research in the US from 2.6% to 3% of GDP. The EU set itself the same goal in 2000, although the current level of investment is only 1.84%. But Japan already spends nearly 4% of its GDP on R&D; South Korea spends 3.2%; and China's investment has risen from 0.9% to 1.4% of GDP in less than a decade.[19]

Most developed countries offer tax credits or deductions on eligible R&D expenditure. The US offers a credit of 20% on qualifying expenditure that exceeds 16% of a company's gross receipts in the preceding four periods, for example; Canada offers a credit of 35% on qualifying expenditure up to a maximum of CAN $3 million and 20% thereafter; and Japan offers a credit of between 8% and 10% on gross R&D costs, depending on the ratio of R&D costs to sales. Similarly, Australia allows companies to deduct 125% of their eligible expenditure (and 175% of their incremental expenditure, if that expenditure increases by more than the previous three-year average), while the UK offers a deduction of 130%.[20]

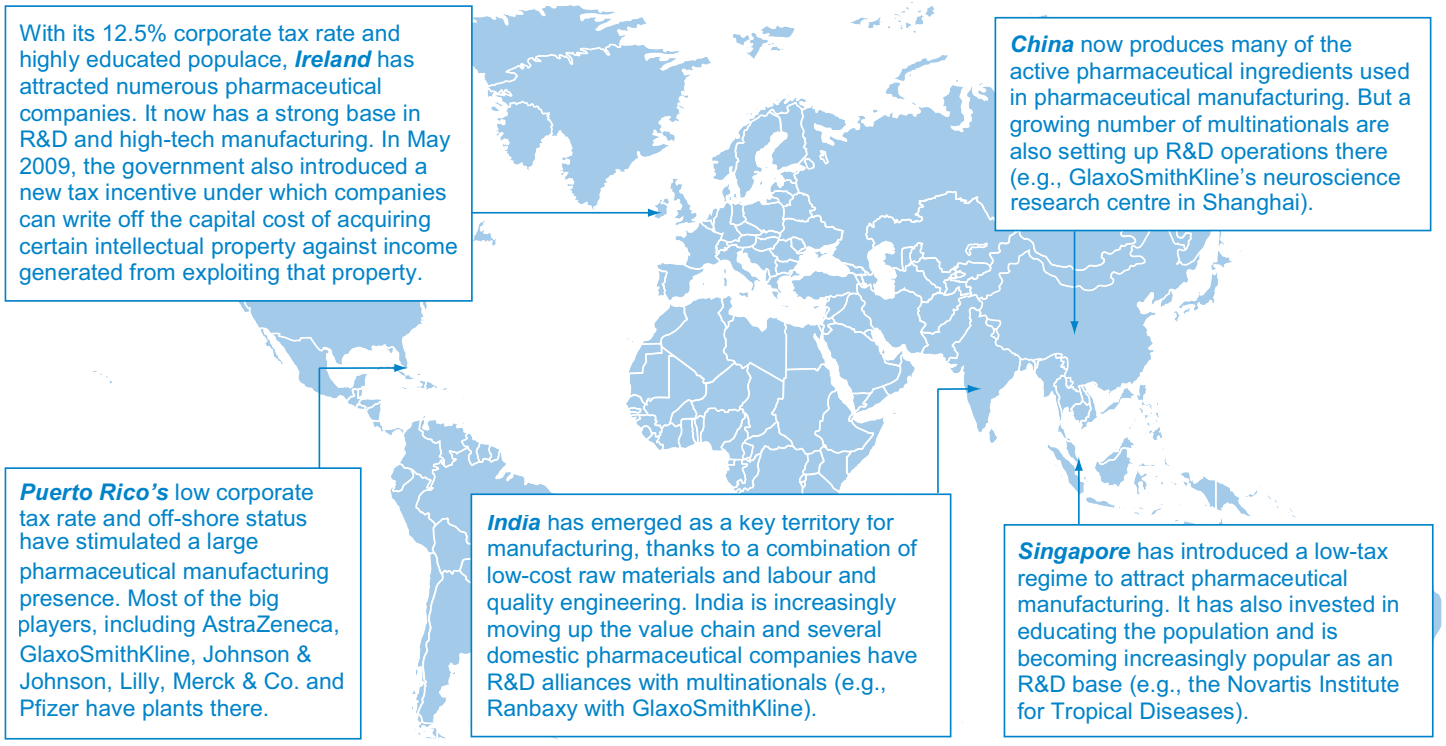
However, several Asian countries are now pitching equally hard for a share of the R&D market. China and Singapore both offer "super deductions" of 150% on qualifying R&D expenditure. Singapore offers eligible companies an additional deduction of up to 100%,

subject to approval, together with generous capital allowances. And India offers various incentives, including a deduction of 100% of eligible expenditure (whether revenue or capital, except expenditure on land) in the year that the expenditure is incurred.[21]

The competition to attract companies setting up new manufacturing facilities is also rising. Ireland and Puerto Rico have established particularly strong manufacturing bases, thanks to corporate income tax rates of 12.5% and 20%, respectively. But Asia is fast catching up here, too (see **Figure 6**). Singapore offers a low flat corporate income tax rate of 18% (falling to 17% in 2010), and grants qualifying new companies full exemption from tax on the first $100,000 of annual profits for each of the first three consecutive tax-filing years.[22] China recently reduced its corporate income tax rate from 33.3% to 25% – or 15% for companies that are recognised as "new, high-technology enterprises", although the simultaneous abolition of many tax incentives and the introduction of a 10% foreign withholding tax on passive income have complicated the picture.[23] And India grants tax holidays for locating manufacturing in certain states or economic development zones.[24]

We believe that the battle to attract pharmaceutical companies will intensify over the next decade, as some of

Figure 6: Competing tax incentives



Source: PricewaterhouseCoopers

the emerging nations attempt to build knowledge-based economies. Pharmaceutical tax executives will thus need to monitor the situation constantly, so that they can advise management on the best places in which to locate new facilities – although no company will make such decisions on the basis of tax incentives alone. It is also crucial to bear in mind a country's political and economic stability, infrastructure, attitude to intellectual property rights, the availability of its workforce and other such risks.

Scientific, structural and social trends shaping the future taxation of Pharma

The prospect of politically and economically motivated changes in taxation is not all that Pharma will have to consider. The industry's research focus is altering, the emerging markets are becoming increasingly attractive, the supply chain is bifurcating and healthcare delivery is undergoing a huge transformation. All these trends are dictating the need for new business models – and, since a company's tax strategy follows its business strategy, an understanding of these shifts is essential.

The changing product mix

A growing number of pharmaceutical companies are investing in the development of specialist therapies as the genomic sciences produce new tools with which to make large molecules that mimic naturally occurring molecules in the human body and generic manufacturers occupy an ever larger part of the primary care space.

But translating the knowledge gleaned from mapping the human genome into safe, effective new medicines is proving difficult, and the industry leaders are struggling to fill their pipelines. They have adopted several tactics for dealing with the shortfall, each with its own tax implications.

Not surprisingly merger and acquisition (M&A) activity has surged. Indeed, in the first quarter of 2009, the value of the deals that took place was $166 billion – 46% more than the $114 billion that changed hands in the whole of 2008.[25] Some of this activity reflects two recent mega-mergers (Pfizer-Wyeth and Merck & Co.-Schering Plough), but some of it stems from the convergence of the pharmaceutical and biotechnology sub-sectors. In 2008, Big Pharma completed $33.5 billion worth of biotechnology acquisitions in the US and Europe.[26]

We anticipate that this trend will continue for the foreseeable future and that many companies will therefore need to pay more attention to how such business combinations are taxed. Clearly, their individual circumstances will determine the precise impact. But, under the current M&A standards in some countries, the way in which a company accounts for acquisition-related items – such as deal costs, acquired valuation allowances, deferred tax adjustments, income tax contingencies, income tax indemnifications, contingent consideration and share-based compensation – can have a significant effect on its ETR.[27]

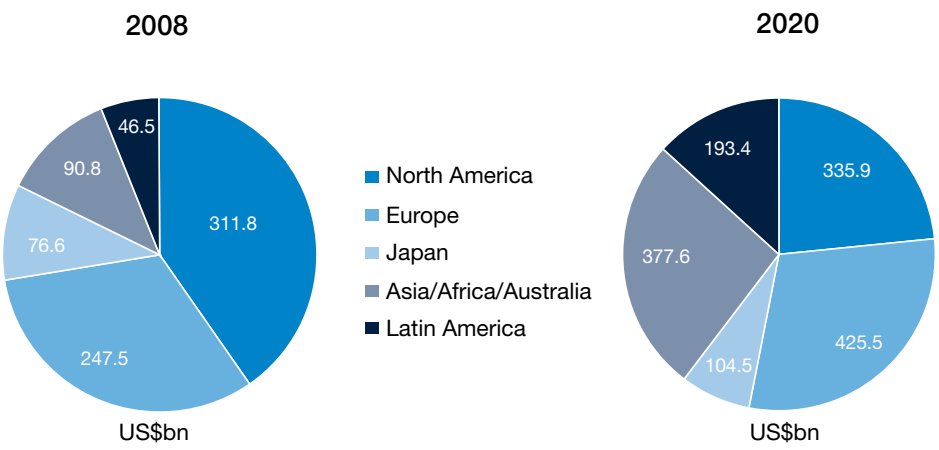
In-licensing is likewise on the rise. PAREXEL estimates that in-licensed products currently account for 32% of the pipelines of the top 10 pharmaceutical companies,[28] and we think that percentage will grow substantially over the next decade. Again, in-licensing can have significant tax consequences, depending on the structure of the contract and its provisions for allocating losses and tax credits and for making payments.

Many pharmaceutical companies are also forming increasingly complex relationships with other organisations both inside and outside the industry – a pattern that will become even more pronounced over the next 10 years. New technologies are facilitating the collection of vast quantities of outcomes data and the virtualisation of large parts of the R&D process, as we explained in "Pharma 2020: Virtual R&D".[29] But any company that wants to capitalise on these advances will have to collaborate with numerous other agencies, including hospitals, clinics, academic institutions, bioinformatics firms and technology providers. Moreover, some of the alliances it strikes are likely to involve multiple entities, staggered levels of profit-sharing and dissimilar participatory rights between the parties – all factors that will add to the intricacy of its tax arrangements.

The increasing importance of the emerging markets

Meanwhile, the purchasing power of the emerging economies is rising rapidly, with a corresponding boom in demand for Western medicines. In 2008, global pharmaceutical sales reached $773.1 billion. Asia, Africa and Australia accounted for nearly 12% of this sum, while Latin America accounted for 6%. But IMS Health predicts that all four markets will increase at a compound annual growth rate (CAGR) of 11-14% between 2009 and 2013.[30] This is broadly in line with the higher of the two forecasts we published in "Pharma

Figure 7: The global pharmaceutical market by region, 2008 & 2020



Sources: IMS Health Total Unaudited and Audited Global Pharmaceutical Market by Region (2008); IMS Health Market Prognosis (March 2009); and PricewaterhouseCoopers analysis.

Note: IMS Health has produced lower and upper projections for the growth of the global pharmaceutical market over the next five years. We have extrapolated from these projections to estimate the regional split in 2020, using the midpoint between the upper and lower ranges.

2020: The vision", where we estimated that the E7 markets – Brazil, China, India, Indonesia, Mexico, Russia and Turkey – could grow by between 10% and 15% a year.[31]

Given that the North American, European and Japanese markets are growing much more sluggishly, the Asian, African, Australian and Latin American markets will thus account for a much greater share of the industry's revenues by 2020. Indeed, we project that they could collectively be worth about $571 billion – or nearly 40% of the total market (see **Figure 7**).

Clearly, some pharmaceutical companies may choose to serve certain countries by using independent intermediaries domiciled in other jurisdictions. A company that wants to target Latin America might, say, use an agent based in Brazil to market its products throughout the region. The countries in which a company earns an income and those in which it makes a profit may also be different – and for the purposes of taxation, it is the latter that counts. Even so, it seems likely that a greater presence in the emerging markets will boost the proportion of the industry's profits that is generated in high-tax locations because some of these countries have relatively high tax rates. Further compounding the challenges involved in ensuring compliance, most emerging nations have tax regimes that are less fully developed and less clearly articulated than those of the industrialised economies.

The bifurcation of the supply chain

The emerging countries are not only becoming more attractive places in which to sell medicines; they are also playing a more prominent role in the manufacturing process. The global market for pharmaceutical contract manufacturing is expected to rise from about $20.4 billion in 2008 to more than $31 billion by 2012, with much of the increase concentrated in Asia, where the market is growing at a CAGR of nearly 16%.[32]

However, outsourcing to manufacturers in the developing world carries some substantial operational risks. In 2008, for example, the US Food and Drug Administration (FDA) banned imports of more than 30 generic medicines produced by India's Ranbaxy Laboratories, after finding serious and extensive violations of good manufacturing practice at two Ranbaxy plants.[33]

Moreover, it is much more difficult to manufacture and distribute biologics than chemical entities. Biologics are more vulnerable to impurities in the production process and more susceptible to damage from heat, light and motion.[34] The challenges associated with making gene and tissue-based therapies are even greater; each sample must be individually "manufactured", and the final steps in the process must be performed at a location that is close to the patient.

We therefore believe that, by 2020, most pharmaceutical companies will adopt a two-pronged approach. They will outsource the production of mass-market medicines to contract manufacturers in low-cost, low-tax jurisdictions, but they will manufacture and distribute complex specialist therapies themselves. That, in turn, could have major ramifications for many companies' ETRs. Making specialist therapies in end markets where tax rates may be higher could substantially increase the taxes they pay.

Figure 8: Price controls in Pharma's main markets

Country	Free Pricing	Direct Price Controls			Indirect Price Controls					
		International Price Comparisons	Price Ceilings	Cost-Benefit Analyses	Reference Pricing	Profit Controls	Co-payments	Price-Volume Agreements	Negative Lists	Positive Lists
France		■	■	■	■		■	■		■
Germany	■				■		■		■	
Italy		■	■	■	■		■	■		■
Spain		■	■	■	■		■	■	■	■
UK	■			■		■	■		■	
US	■					■	■	■		■
Canada		■	■	■	■		■			■
Japan		■	■				■			■

Sources: Petra Laux & Jens Grüger, "Pricing and Reimbursement of Pharmaceuticals: A Political and Technical Perspective" (June 2007); Frost & Sullivan, "Drug Approval Process in Europe: An Outlook" (December 2008); Valérie Paris & Elizabeth Docteur, "Pharmaceutical Pricing and Reimbursement Policies in Canada" (2006).

More demanding healthcare payers

The dramatic changes currently taking place in healthcare delivery will have an even bigger impact on the taxation of Pharma. The global healthcare bill is soaring, as the population ages, new medical needs emerge and the disease burden of the developing world increasingly resembles that of the developed world. Healthcare payers almost everywhere are therefore beginning to measure outcomes much more carefully and to experiment with new pricing mechanisms.

Use of direct and indirect price controls is already commonplace in the industry's main markets (see **Figure 8**).[35] A number of countries have also established agencies specifically to conduct pharmacoeconomic evaluations of new medicines, with predictable consequences for the industry's returns. In one study of 150 top-selling patented medicines, for example, ex-manufacturer prices in Italy, France and Spain were only 40% of those in the US, where free market pricing prevails.[36]

However, there are signs of a major shift within the US, too. In June 2009, the member companies of trade body Pharmaceutical Research and Manufacturers of America agreed to contribute $80 billion towards the narrowing of the gap in Medicare prescription medication coverage over the next decade, partly by reducing the prices charged to senior citizens and government for all branded medicines.[37] And US Senate Finance Committee Chairman Max Baucus recently introduced a bill to reform the healthcare system that includes a provision to offset the costs by imposing annual fees of $2.3 billion and $4 billion on pharmaceutical manufacturers and medical device manufacturers, respectively. The fees would be apportioned among the participants according to each participant's relative market share of domestic sales for the preceding year.[38]

Meanwhile, several countries with socialised healthcare systems are going still further. The French government recently introduced a bonus scheme for doctors who meet its generic prescribing targets in seven pharmaceutical categories,[39] for example, while the British National Health Service has launched a flexible pricing scheme under which the prices of medicines can be lifted or lowered in line with the results they deliver.[40]

Some significant practical and procedural issues still have to be resolved, if pay-for-performance is to work widely, including: what factors should trigger a price review; how to deal with products that deliver different value for different indications; and how to treat revenues that could be clawed back via rebates several years later, since it may take a while to determine the real worth of many new medicines. Such clawbacks could have considerable cash tax ramifications, depending on how and when a company has recognised the revenue

and whether it has a net operating loss.[41] Nevertheless, we believe that, by 2020, pay for performance will be the norm in many countries.

Most healthcare payers are also beginning to emphasise the importance of health management, with even more momentous consequences. As we have indicated in earlier papers, we anticipate that the majority of pharmaceutical companies will have to supplement the medicines they make with supporting services, such as compliance programmes, nutritional advice, physiotherapy, stress management and health screening. Several Big Pharma companies have already started exploring this route, one example being Novartis, which is currently testing a technology that inserts a tiny microchip into each pill and sends a text message to patients who forget to take their medicine.[42]

In the future many pharmaceutical companies will generate revenues from services as well as from products. And they will collaborate with a wide range of organisations to supply such integrated product-service offerings. However, these two changes have huge tax implications, which we shall discuss in the next chapter.

The taxation of new business models

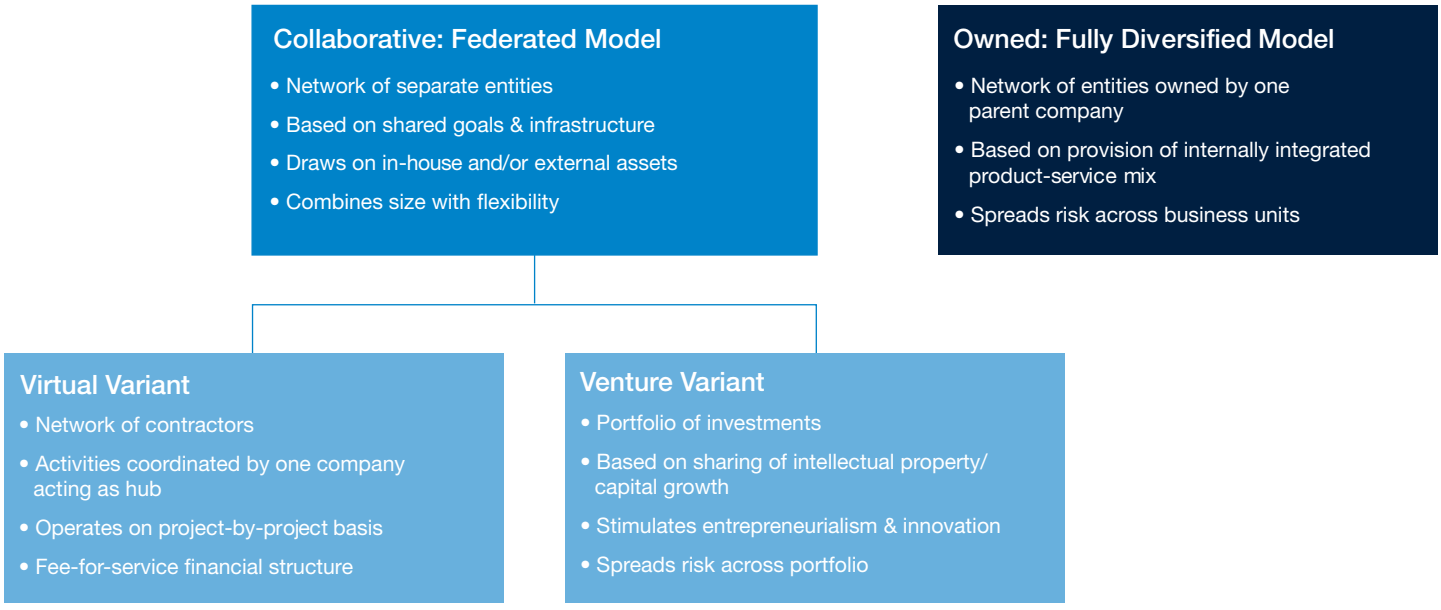
The majority of Big Pharma companies already recognise that they need new business models. When Pfizer announced the $64 billion acquisition of Wyeth, for example, chief executive Jeff Kindler told Bloomberg News: "Once you reach a certain size, if you are dependent on one or two huge blockbusters to move the needle, you are raising the bar on R&D productivity beyond an amount anyone can deliver."[43]

As we explained in "Pharma 2020: Challenging business models", we expect that two principal models – federated and fully diversified – will emerge. We have also identified two variants of the federated model. In the virtual version, a company outsources most or all of its activities; in the venture version, it manages a portfolio of investments (see **Figure 9**).

Seen from a tax perspective, these models possess a number of common characteristics:

- They provide a framework for diversifying beyond a company's core product offerings and supplying patients with integrated packages of goods and services, wherever those patients reside.

Figure 9: The business models that are likely to prevail in 2020



Source: PricewaterhouseCoopers

- The supply chains they use are more complex and responsive than those that currently exist, because many specialist therapies must be delivered on demand.
- The intellectual property they produce goes beyond legally protected patents and R&D know-how. It includes skills like the ability to capture, aggregate and analyse data, and to negotiate with payers and joint-venture partners.
- The risks and rewards they create are spread among the member companies or respective business units, where the entity is a conglomerate.
- The income they generate is dependent on outcomes.

We think that these models will have a bearing on how pharmaceutical companies are taxed in six key ways.

Six key tax issues to consider

1. Providing services will drive up effective tax rates.

The provision of integrated healthcare packages that include services which must be supplied locally (such as drug administration training, home delivery, physiotherapy, health screening and exercise facilities) will increase the proportion of income that is generated in the industry's end markets. That, in turn, will make it more difficult for companies to assign profits legitimately from high- to low-tax jurisdictions – and, since demand for such services is, initially at least, likely to be greatest in the industrialised world, where corporate income tax rates are often higher, the effect could be very pronounced.

The introduction of live licensing – where new medicines are approved subject to further testing to substantiate their safety and efficacy – could provide some relief, since the industry would then be required to perform extensive "in-life" studies in its end markets, thereby giving it greater cash deductibility. However, scientific and technological advances will ultimately reduce the cost of such studies dramatically.[44] We therefore expect that many of those pharmaceutical companies which move into the service arena will see their ETRs rise.

2. Providing services will increase the risk of creating a "permanent establishment", even where those services are delivered remotely.

The principle of "permanent establishment" is critical in determining where the income from the sale of goods and services is to be taxed. If a company sells goods or services in a country in which it does not have a fixed place of business (including a place of management) or dependent contracting agents, that country has no jurisdiction to tax the resulting profits.

However, any company that delivers services will have to undertake – or manage – more business activities in its end markets, thereby making it harder to prove that the company has not created a permanent establishment. This may increase the risk of failing to obtain double tax relief, as allowed under international tax treaties, and thus of being taxed on the same earnings in the home country and the country where the services have been delivered.

The growing complexity of the supply chain will compound the risk of being taxed twice on the same income. Most double-taxation disputes involve inter-company or intra-company allocations – typically, pricing, royalty rates, interest payments, management fees, business expenses and gross revenues.[45] With more complex networks of alliances involving more (and more varied) partners, the allocation of such items will become very much more complicated.

In the US, where there is both federal and state taxation, the delivery of services directly to patients might also be regarded as enough to create a "nexus" for the purposes of state taxation. Under the traditional definition, some sort of physical presence is required; but a number of states have recently extended the concept, arguing that economic connections are sufficient to establish a nexus.[46]

Such arguments are usually motivated by the desire to increase the tax take from out-of-state companies, but they are by no means exclusive to competing US states. The financial difficulties many governments are currently experiencing, as they contend with the global recession, have already eroded the international consensus on the allocation of taxing rights between residence and source countries. So global companies with extended supply chains are more likely to be caught in the crossfire and subjected to double taxation, even if they are in compliance with the relevant tax treaty.

3. Providing services will increase companies' withholding tax liabilities.

The purpose of a cross-border withholding tax is to facilitate the collection of tax on that part of the profit which arises from the provision

of goods or services in the taxpayer's country. However, countries have traditionally adopted a more diverse approach to the application of withholding taxes to payments for services than they have to payments for goods. These variations can result in substantial differences in the way in which companies are treated, producing yet more fodder for tax disputes.

In the US, for example, the place in which services are performed generally determines the source (US or foreign) of the income those services generate. But the regulations governing international information reporting and withholding taxes are so intricate that many companies find it difficult to comply with them.

Compliance with multiple national and regional regulations governing withholding taxes is already a major challenge. But the provision of direct-to-patient services – some of which must be delivered physically and some of which may be delivered electronically – will make it even more difficult for the industry to negotiate its way through the maze.

Moreover, many multinationals may find it harder to claim credit for the foreign taxes they have paid. In a recent speech to the OECD, Internal Revenue Service (IRS) Commissioner Doug Shulman announced that the amount of foreign tax credits claimed by US firms rose by 71% between 2000 and 2007. He made it clear that policing the increasingly complex world of international taxation is "a top agenda item" for the IRS.[47] And, as we have already noted, the US is not alone in its determination to secure a larger share of the income domestic companies generate beyond its borders.

4. Where services rather than goods are supplied, exposure to controlled foreign corporation legislation will increase.

Many developed countries – including Australia, Canada, France, Germany, Italy, New Zealand, the UK, the US and Japan – have enacted laws governing the taxation of controlled foreign corporations (CFCs). These laws usually provide that the profits of a CFC may be attributed to the holding company and taxed immediately, rather than being taxed only when (and if) they are repatriated.

CFC legislation often distinguishes between "passive" income (i.e., interest, dividends, annuities, rents and royalties), which is taxed, and "active income (i.e., income from commercial activities), which is not taxed. But the laws outline various exceptions.[48] In the US, for instance, Subpart F of the IRS Code stipulates that "foreign base company services income" – including income generated from the performance of certain personal services outside a company's home country – cannot be deferred. Similar rules apply in Germany, Japan and the UK. Some of the new healthcare services pharmaceutical multinationals provide may fall into this category, and the income they generate from such services would thus be subject to immediate taxation in their home countries.

5. The allocation of income among the participants in the supply chain will become much more difficult, compounding the challenges associated with the administration of transfer pricing for companies and tax authorities alike.

Transfer pricing – i.e., the allocation of income among related business entities via the pricing of intellectual property, tangible goods, services and loans or other financial transactions – enables multinationals to avoid double taxation. But it is also open to abuse. It can be used to shift profits *artificially* from a high- to a low-tax jurisdiction, by maximising expenses in the former and income in the latter.

Many tax authorities are therefore clamping down where they suspect that an organisation has manipulated its internal pricing arrangements to reduce the taxes it pays rather than following the arm's length policy recommended by the OECD: namely, that a transfer price should be the same as if the two companies involved were independent parties, not part of the same group.[49] We anticipate that this trend will continue and that, by 2020, the tax authorities in many countries will cooperate more closely, making it even more important that companies comply with the differing requirements of multiple tax jurisdictions.

However, as Pharma expands into new markets over the next decade, and the number, magnitude and complexity of the cross-border, inter-company transactions in which it engages grows, this will become even more difficult. Many pharmaceutical companies will need to collaborate with numerous organisations in numerous areas of business and numerous countries. Measuring their respective contributions – not only the goods and services, but the intellectual property, investment capital, advisory services and other such inputs they provide – and allocating the income accordingly will be an enormous undertaking.

6. Indirect taxes will become more complex and more difficult to manage in collaborative supply chains.

Lastly, providing integrated packages of products and services could increase the compliance costs and risks associated with indirect taxes. Consider, for example, the potential impact on VAT. Pharmaceutical companies can currently recover the VAT they pay – i.e., the input VAT – on all the expenditure they incur in bringing products to market. In many tax regimes, patients also pay a lower rate of VAT on medicines than on most other kinds of goods. This benefits both the industry and patients.

However, the delivery of bundled healthcare packages comprising products and services could change that paradigm. Some VAT regimes may apply the appropriate rate of VAT to each component, while others may treat them as part of a composite offering and apply the rate of the principal element to the entire package.

Suppose, for instance, that the standard rate of VAT is 20% and that the rate of VAT on medicines is 10%. If a healthcare package is considered a combination and the principal element is a service, all the elements will be taxed at 20%. The industry will still be able to recover its input VAT (via the output VAT it charges on what it sells), but patients will have to pay more for the medicines they buy.

The characterisation of the service component may also have significant consequences for the purposes of VAT. If it is regarded as an exempt medical service, no VAT will arise on the charge to the consumer, but the supplier will be unable to recover its VAT on related inputs. This is akin to the situation in the financial services industry, where VAT-exempt services are an absolute cost that must be built into prices. Treating entire healthcare packages as VAT-exempt could even more seriously impair the recovery of input VAT in the supply chain.

Local regulators tend to have more settled views on products than services, so there is considerable potential for national variations in the interpretation of the VAT rules applicable to integrated healthcare offerings. However, the EU has adopted a VAT package that should simplify the situation within the 27 member states and allow a greater range of cross-border services to qualify as VAT-free, with effect from January 1, 2010. Other regions may yet adopt similar frameworks.

The increasing importance of the emerging markets, evolving supply chain and shift to services could also have a major bearing on the customs duties and other trade-related tariffs pharmaceutical companies incur. A number of countries levy significant import duties on key active pharmaceutical ingredients and finished products, and the valuation of combined product-service offerings for customs purposes could prove complicated.

Fortunately, some of these problems may be ameliorated with the negotiation of additional free trade agreements. The original signatories to the Association of Southeast Asian Nations (ASEAN) Free Trade Agreement aim to eliminate almost all import duties on goods originating within the area by 2010, for example, while the four more recent members (Cambodia, Laos, Myanmar and Vietnam) plan to do so by 2015. Australia and New Zealand also signed a free-trade agreement with ASEAN in February 2009,[50] and China is scheduled to join them in 2010.[51] But managing a supply chain that involves multiple parties and spans multiple jurisdictions in a way that capitalises on such agreements to minimise import duties requires careful planning.

The potential impact on ETRs

So how might the changes we have outlined affect the industry? Clearly, numerous factors determine a particular company's ETR, and it would be impossible to predict the full gamut of possibilities. However, we have quantified the potential impact of one major change – the generation of revenues from the delivery of services – on a hypothetical pharmaceutical group to provide a very simple illustration of how its ETR might alter. We have assumed that the group is domiciled in the US (where the federal corporate tax rate is currently 35%) and that it earns a taxable income of $100m a year.

In our baseline scenario, the group only sells products. Fifty-five percent

of its global income is attributable to intellectual property, which is owned by a subsidiary in the Cayman Islands (where the tax rate is 0%). Another 35% of the group's income is taxable in the US. The remaining 10% is taxable in equal proportions in Brazil (where the tax rate is 15%, with a 10% surcharge on taxable income above R$240,000); China (where the tax rate is 25%); and India (where the tax rate is 40% for foreign corporations). Under these circumstances, the group's ETR is 15.25%.

In our second scenario, the group sells integrated healthcare packages, and services account for 25% of the taxable income it generates. This service income is spread equally between the US, Brazil, India and China, and is taxable at the normal rate in each country. The income the group earns from products – primarily in the Cayman Islands – is correspondingly smaller. Under these circumstances, the group's ETR is 19.55% (see **Figure 10**).

In short, as the dynamics of the marketplace become increasingly challenging, and a growing share of the profits they earn comes from the provision of services as opposed to products, we anticipate that many pharmaceutical companies could see their ETRs rise. They will only be able to mitigate the risk with active tax planning.

How the industry should respond

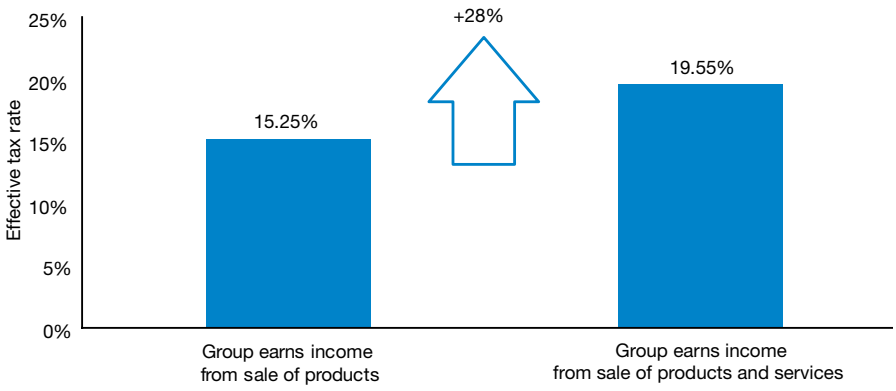
A company's tax strategy should obviously be aligned with its business strategy. So the development of new business models, together with the possibility of harsher tax regulations, will require the development of new tax strategies – strategies that are tailored to the models individual pharmaceutical companies choose. Three issues are likely to be especially important.

The formation of a tax-effective structure

With more collaborative supply chains, the traditional model of separating the tax jurisdictions in which costs (e.g., financing) are incurred and those in which revenues are generated will change. Any commercial arrangements should therefore be structured to minimise the potential impact on ETRs (subject, of course, to any legal restrictions or other issues that may apply)

- **The funding of acquisitions:** The relative attractions of equity and debt finance depend on several criteria, including an organisation's tax status, the dividends or interest rate it would be required to pay, the availability of tax relief on interest payments, the financial signals a particular decision might send and the impact on its cost of capital. Historically, pharmaceutical companies have often favoured debt finance and enjoyed full tax relief on the interest. But, by 2020, some of the acquisitions they make will involve entities with different tax positions (e.g., non-profit bodies, venture funds and private companies) and different tax profiles (e.g., contract manufacturers,

Figure 10: How the provision of services might increase a pharmaceutical company's ETR



Source: PricewaterhouseCoopers

distributors and intellectual-property owners). Determining how best to fund such acquisitions, and reconciling the needs of the different parties, will be a very complex business indeed.

- **The choice of legal entity:** Today, most pharmaceutical companies operate as corporations, but this may not be the most tax-efficient structure for those that adopt federated business models. Such firms may want to establish pass-through entities – e.g., partnerships,[52] S corporations[53] and limited liability companies,[54] which generally permit investors to benefit from losses and credits and offer tax advantages. They prevent income from being subject to double taxation and create opportunities for reducing the cost of capital.

The location of more value-adding activities in regional hubs

The vast majority of multinationals use regional hubs in low-tax locations or high-tax jurisdictions that offer generous R&D tax incentives to manage many of their activities. Some of them may want to think about extending the functions these hubs perform. So, for example:

- **R&D:** A hub specialising in R&D could assume responsibility for coordinating and managing relations with third-party research organisations, administering the complex funding mechanisms needed to pay for outsourced research, negotiating intellectual property contracts, registering and enforcing patents, and the like.
- **Manufacturing:** A hub specialising in manufacturing could assume responsibility for managing the supply chain, including planning production schedules, coordinating the activities of different manufacturers, distributors and service providers, and allocating the profits among the respective contributors.
- **Market:** A hub specialising in market issues could assume responsibility for managing negotiations with healthcare policy-makers and payers, and capturing and analysing market data.

Alternatively, some multinationals may want to establish regional hubs covering a combination of these activities.

A hub structure has several practical advantages. It helps companies to optimise the use of their resources; promote the development of expertise and dissemination of best practice through common standards, tools and processes; generate economies of scale; and break into new markets. But the key point, for tax-planning purposes, is that companies should identify the attributes which are likely to add most value and thus to increase the income that can be allocated to such hubs.

Collective management of indirect taxes and customs requirements

The globalisation of the pharmaceutical supply chain and provision of product-service offerings will accentuate the challenges of managing indirect taxes and customs requirements, necessitating a more collaborative approach. Many companies will need to address VAT collectively, for example. They will also need to monitor international negotiations concerning the development of new free-trade agreements and free-trade zones. (Although free-trade zones are physically inside a country, they are outside its customs territory and often provide significant advantages, such as the elimination of duties, deferred duty payments, exemption from customs inspections or expedited clearance).

Lastly, all pharmaceutical companies will have to manage their export licensing as efficiently as possible, since there is unlikely to be any diminution in the control national authorities exercise over trade flows. To this end, many companies may want to consider joining the US Customs Trade Partnership Against Terrorism (C-TPAT) or becoming Authorised Economic Operators within the EU. Companies participating in these two schemes benefit from simpler customs procedures and reduced customs controls. But satisfying the rules requires robust processes, solid risk management skills and a considerable degree of automation, as well as close cooperation with the key members of the supply chain, including carriers, brokers and warehouse operators.

Conclusion

For the past 20 years, Pharma has benefited from a benign legislative and commercial environment that has enabled it to report low and stable tax rates. Governments have permitted the use of low-tax jurisdictions, and the industry has been able to demonstrate that a large portion of the profit it earns comes from the intellectual property it creates – much of which is located in low-tax countries.

As we have explained, however, both these elements are changing. First, many governments are trying to curb the use of low-tax jurisdictions in an effort to repair their damaged finances. Second, the new business models Pharma is beginning to adopt mean that a much larger share of the economic value it generates will rest on the ability to prove that its products really work and that the benefits they provide come at a reasonable cost. In other words, the economic value companies create will increasingly depend on the activities they perform in their local markets, as distinct from their underlying intellectual property.

The industry's tax rates will come under sustained pressure, then, and the strategies it has previously employed will no longer deliver the ETRs it has come to expect. The question is: what should it do now? The answer is complex, not least because the situation of individual companies within the sector differs significantly, depending on their country of domicile. We therefore anticipate that various approaches will emerge, although they are likely to have at least two common features.

Companies based in high-tax jurisdictions will have lower returns on capital over the long term and will thus be at a significant competitive disadvantage, compared to those based in low-tax jurisdictions. We expect all such companies to evaluate the potential for moving to a more favourable regime.

However, no government can ignore the importance of attracting and retaining investment – and there is ample evidence that governments are willing to modify their tax policies in order to woo revenue-generating sectors. Pharma is one such industry; it is a consistent source of wealth and a provider of high-value jobs, both attributes that are critical to economic recovery.

Those pharmaceutical companies that are based in high-tax jurisdictions will therefore have to make a compelling case for concessions on the rate at which they are taxed. And their tax departments will play a key role here, both by providing the information required to demonstrate that such concessions are justified by the total economic contribution they make and by participating in the lobbying process.

The increasing complexity of the pharmaceutical supply chain will result in yet another change in the tax department's remit. As healthcare payers almost everywhere insist on evidence of therapeutic benefit and adopt new pricing mechanisms, so the delivery devices and distribution channels companies use are becoming more heterogeneous. The importance of information is also growing. All these factors will make analysis of the supply chain – and the value the respective stages produce – more difficult than before.

We anticipate that the methods companies use for allocating income among the different elements of their supply chains will vary much more widely, depending on the complexity of their manufacturing arrangements and the availability of evidence demonstrating clinical efficacy. This will make transfer pricing – and the ability to prove that appropriate prices have been used – particularly challenging.

The tax department will thus have to build a much closer relationship with the operational parts of the business and acquire a much more detailed understanding of the complexities of its supply chain arrangements. It will also have to develop strategies to fit a broader, more diverse range of circumstances – some of which may be unprecedented.

To sum up, by 2020, there will be a much greater range of ETRs in the industry, reflecting the success with which companies respond to a more demanding environment, and pharmaceutical tax executives will play a crucial role in determining that success. Those who can combine a strong grasp of long-term strategy and effective lobbying with a detailed tactical understanding of the way in which products are distributed and value is created will be best placed to help pilot their companies along the path to future prosperity.

Acknowledgements

We would like to thank the many people at PricewaterhouseCoopers who helped us to develop this report. We would also like to express our appreciation for the input we received from clients and our particular gratitude to the following external experts who so generously donated their time and effort to the project:

Michael P. Reilly, Vice President, Taxation, Johnson & Johnson

Robert B. McGovern, Vice President Corporate Tax, Merck & Co., Inc.

The views expressed herein are personal and do not reflect the views of the organisations represented by the individuals concerned.

References

1. We define a business model as the means by which a company makes a profit – how it addresses its marketplace, the offerings it develops and the business relationships it deploys to do so.
2. By effective tax rate, we mean income tax expense divided by income before taxes, expressed as a percentage.
3. "Adding Up the Government's Total Bailout Tab", *The New York Times* (February 4, 2009) http://www.nytimes.com/interactive/2009/02/04/business/20090205-bailout-totals-graphic.html (accessed May 11, 2009). All subsequent references are to US dollars unless otherwise specified.
4. Elitsa Vucheva, "European Bank Bailout Total: $4 Trillion", *BusinessWeek* (April 10, 2009) http://www.businessweek.com/globalbiz/content/apr2009/gb20090410_254738.htm (accessed May 11, 2009).
5. International Monetary Fund, "World Economic Outlook" (April 2009) http://www.imf.org/external/pubs/ft/weo/2009/01/pdf/text.pdf (accessed May 11, 2009). The G-20 comprises Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, the UK, US and European Union.
6. US Government Accountability Office, "US Multinational Corporations: Effective Tax Rates Are Correlated with Where Income Is Reported", GAO-08-950 (August 2008), pp. 3–4.
7. The White House, "Remarks by the President on International Tax Policy Reform" (May 4, 2009), http://www.whitehouse.gov/the_press_office/Remarks-By-The-President-On-International-Tax-Policy-Reform/ (accessed June 11, 2009).
8. Neil King Jr. & Elizabeth Williamson, "Business Fends Off Tax Hit", *Wall Street Journal* (October 14, 2009) http://online.wsj.com/article/SB125539099758581443.html (accessed October 15, 2009).
9. "Four countries on OECD tax haven blacklist", *Reuters* (April 2, 2009) http://www.reuters.com/article/GCA-G20/idUSTRE53177T20090402 (accessed May 29, 2009).
10. Vanessa Houlder, "Revenue fuels aid agency's row with accounting firms", *Financial Times* (June 2, 2009) http://www.ft.com/cms/s/b559c2c6-4f0b-11de-8c10-00144feabdc0,Authorised=false.html?_i_location=http%3A%2F%2Fwww.ft.com%2Fcms%2Fs%2F0%2Fb559c2c6-4f0b-11de-8c10-00144feabdc0.html&_i_referer=http%3A%2F%2Fsearch.ft.com%2Fsearch%3FqueryText%3Dcountry-by-country%2Breporting (accessed August 3, 2009).
11. Robert Lee, "Britain And France Issue Offshore Sanctions Threat", *Tax-News.com* (July 9, 2009) http://www.tax-news.com/asp/story/Britain_And_France_Issue_Offshore_Sanctions_Threat_xxxx37796.html (accessed August 3, 2009).
12. "2009 Tax Misery & Reform Index", *Forbes Magazine* (April 13, 2009) http://www.forbes.com/global/2009/0413/034-tax-misery-reform-index.html (accessed August 12, 2009).
13. Philippe Naughton & Miles Costello, "Darling accused of prompting British brain drain with tax increase on high earners", *The Times* (April 22, 2009) http://business.timesonline.co.uk/tol/business/economics/budget/article6148726.ece (accessed August 13, 2009).
14. Gary Guenther, "Federal Taxation of the Pharmaceutical Industry: Effects on New Drug Development and Legislative Initiatives in the 109th Congress", Congressional Research Service (February 23, 2009).
15. PricewaterhouseCoopers, "Time arrives for coordination on green taxes", *International Tax Review* (June 2009) http://www.pwc.co.uk/pdf/international_tax_review_green_taxes_june_2009.pdf (accessed August 4, 2009).
16. European Commission, "REACH" (February 19, 2009) http://ec.europa.eu/environment/chemicals/reach/reach_intro.htm (accessed June 11, 2009).
17. Jeff Donn, Martha Mendoza & Justin Pritchard, "Meds Lurk in Drinking Water", The Associated Press (March 10, 2008) http://www.msnbc.msn.com/id/23503485/ (accessed June 3, 2009).

18. European Federation of Pharmaceutical Industries and Associations, “The Pharmaceutical Industry in Figures” (2009), p. 2. Japanese and European spending converted from local currencies to US dollars at mid-market rates May 8, 2009. Japanese investment based on spending in 2007.
19. Paul Rincon, “Obama Vows Investment in Science”, *BBC News* (April 27, 2009) http://news.bbc.co.uk/2/hi/science/nature/8020930.stm (accessed April 29, 2009).
20. PricewaterhouseCoopers research. Please note that this is a brief summary of the main R&D incentives available in various countries. It does not aim to provide a complete picture.
21. Ibid.
22. “Singapore Corporate Taxation”, *AsiaBiz*, http://www.asiabizsetup.com/singapore-corporate-taxation.aspx (accessed May 15, 2009).
23. Claus Schuermann and Jane Wang, “Tax Planning with a Pharma-spin: Planning Techniques Will Become Increasingly Important When Doing Business in China”, *BusinessForum China* (Vol. 3, 2009), pp. 70-72, http://www.bfchina.de/index.php?option=com_content&task=view&id=209&Itemid=53&contentid=480 (accessed July 20, 2009).
24. Embassy of India, “Taxation System”, http://www.indianembassy.org/newsite//doing_business_in_india/fiscal_taxation_system_in_india.asp#2a (accessed May 15, 2009).
25. “Report: 1Q Pharma Deals Exceed Total for 2008”, *Area Development Online* (April 21, 2009) http://www.areadevelopment.com/newsItems/4-21-2009/pharma-ma-first-quarter-high.shtml (accessed May 5, 2009).
26. Lisa Rapaport, “Takeda, Lilly Lead $28.5 Billion in Biotech Deals, Report Says”, *Bloomberg* (May 5, 2009) http://www.bloomberg.com/apps/news?pid=20601103&sid=af6MrJ47Z.lQ&refer=us (accessed May 5, 2009).
27. PricewaterhouseCoopers, “Mergers & Acquisitions: A Snapshot” (March 2009).
28. “Pharma Taps Biologics”, *ICIS.com* (September 26, 2008) http://www.icis.com/Articles/2008/09/29/9158479/pharma-firms-bolster-pipeline-with-biologics.html (accessed May 8, 2009).
29. PricewaterhouseCoopers, “Pharma 2020: Virtual R&D – Which path will you take?” (June 2008).
30. IMS Health, “IMS Health Market Prognosis” (March 2009) http://www.imshealth.com/portal/site/imshealth/menuitem.a46c6d4df3db4b3d88f611019418c22a/?vgnextoid=cec0977ccedc0210VgnVCM100000ed152ca2RCRD&cpsextcurrchannel=1 (accessed June 4, 2009).
31. PricewaterhouseCoopers, “Pharma 2020: The Vision” (June 2007), pp. 3-5.
32. “World Pharma Contract Manufacturing Market ‘to be worth over $31B by 2012’”, European AIDS Treatment Group (October 23, 2008) http://www.eatg.org/eatg/Global-HIV-News/Pharma-Industry/World-pharma-contract-manufacturing-market-to-be-worth-over-31B-by-2012 (accessed May 18, 2009).
33. Alicia Mundy, Jared Favole & Shirley Wang, “U.S. Medicine Ban Hits Ranbaxy, Indian Maker of Generics”, *The Wall Street Journal* (September 17, 2008) http://online.wsj.com/article/SB122158892271844021.html (accessed April 21, 2009).
34. Kevin Ropp, “Just What Is a Biologic Anyway?” *FDA Consumer* (April 1993) http://www.fda.gov/bbs/topics/CONSUMER/CON00202.html (accessed May 4, 2009).
35. Petra Laux & Jens Grüger, “Pricing and Reimbursement of Pharmaceuticals: A Political and Technical Perspective”, ULB Pharmed Seminar (June 18, 2007) http://www.ulb.ac.be/medecine/pharmed/PDFBCPM/Lauxsem807.pdf (accessed August 13, 2009); Frost & Sullivan, “Drug Approval Process in Europe: An Outlook” (December 2008); Valérie Paris & Elizabeth Docteur, “Pharmaceutical Pricing and Reimbursement Policies in Canada”, OECD Health Working Papers No. 24 (2006) http://oberon.sourceoecd.org/vl=1869792/cl=17/nw=1/rpsv/cgi-bin/wppdf?file=5l4w393hfzq2.pdf (accessed August 13, 2009).
36. UK Department of Health, “Pharmaceutical Price Regulation Scheme: Ninth Report to Parliament” (July 2006), p. 14.
37. Michael A. Fletcher & Ceci Connolly, “Obama Announces Agreement With Drug Companies”, *The Washington Post* (June 22, 2009) http://www.washingtonpost.com/wp-dyn/content/article/2009/06/22/AR2009062200349.html?hpid=topnews (accessed September 21, 2009).

38. The “America’s Healthy Future Act of 2009” was reported out of the Senate Finance Committee on October 13, 2009, and the legislative text was introduced in the Senate by Senator Bacaus on October 19, 2009. The legislation must be merged with health reform legislation reported out of the Senate Health, Education, Labor, and Pensions Committee before being considered by the full Senate. The full text of the “America’s Healthy Future Act of 2009” is available on the Senate Finance Committee website at http://finance.senate.gov/press/Bpress/2009press/prb101909.pdf (accessed October 29, 2009).
39. “Doctors To Receive Bonuses For Prescribing Generic Medicines”, *Pharma and Healthcare Insight* (April 2009) http://www.pharmaceuticalsinsight.com/file/77609/doctors-to-receive-bonuses-for-prescribing-generic-medicines.html (accessed August 14, 2009).
40. UK Department of Health Press Release, “Government and Industry in Medicine Price Deal” (November 19, 2008) http://www.dh.gov.uk/en/News/Recentstories/DH_090459(accessed September 21, 2009).
41. PricewaterhouseCoopers, “Pay-for-performance Arrangements: IRFS Revenue Recognition Guidance” (2008).
42. Andrew Jack, “Novartis chip to help ensure bitter pills are swallowed”, *FT.com* (September 21, 2009) http://www.ft.com/cms/s/0/c1473442-a6f4-11de-bd14-00144feabdc0.html?ftcamp=rss&nclick_check=1 (accessed September 24, 2009).
43. Shannon Pettypiece, “Pfizer Future with Wyeth Is Small Units Like J&J, Kindler Says”, Bloomberg News (February 24, 2009) http://www.bloomberg.com/apps/news?pid=20601103&sid=arNGSDzzP6Go&refer=us (accessed September 21, 2009).
44. For further details of the way in which we believe the development and regulation of medicines will change, please see “Pharma 2020: Virtual R&D”.
45. Edwin J. Reavey & William J. Dunn, “Resolving Transfer-pricing Disputes through the Revised Competent Authority Process”, *The Tax Executive* (May-June 1991) available through BNET, http://findarticles.com/p/articles/mi_m6552/is_n3_43/ai_11032900/ (accessed May 29, 2009).
46. PricewaterhouseCoopers, “Managing Change: State and Local Tax Trends Affecting Businesses in 2009: Looking Back, Looking Ahead” (2009) http://www.pwc.com/en_US/us/state-local-tax/assets/salt_trends_2009.pdf (accessed September 21, 2009).
47. Mike Godfrey, “Foreign Tax Credit Claims Escalate In US”, *Tax-News.com* (June 05, 2009) http://www.tax-news.com/asp/story/Foreign_Tax_Credit_Claims_Escalate_In_US_xxxx37124.html (accessed June 10, 2009).
48. Jason Gorringe, “OECD Member States Tighten Up Their CFC Rules”, *Tax-News.com* (April 11, 2001) http://www.tax-news.com/archive/story/OECD_Member_States_Tighten_Up_Their_CFC_Rules_xxxx3080.html (accessed May 29, 2009).
49. John Neighbour, “Transfer Pricing: Keeping It at Arm’s Length”, *OECD Observer* 230 (January 2002, corrected July 3, 2008) http://www.oecdobserver.org/news/fullstory.php/aid/670/Transfer_pricing:_Keeping_it_at_arms_length.html (accessed June 2, 2009).
50. ASEAN, “Joint Media Statement on the Signing of the Agreement Establishing the ASEAN-Australia-New Zealand Free Trade Area” (February 27, 2009) http://www.aseansec.org/22255.htm (accessed July 20, 2009).
51. Clarissa Oon, “Asean-China trade pact soon”, *The Straits Times* (April 9, 2009) http://www.straitstimes.com/Breaking%2BNews/Asia/Story/STIStory_361370.html (accessed July 20, 2009).
52. A partnership is a form of unincorporated business organisation in which multiple individuals manage the business and are equally responsible for the company’s profits and losses, and its debts and liabilities. The partnership itself does not pay income taxes, but all the partners are required to report their share of the business profits or losses on their individual tax returns.
53. An S corporation is a business entity with 75 or fewer shareholders that elects to be taxed under Subchapter S of Chapter 1 of the US Internal Revenue Code. An S corporation does not pay income taxes. The income or losses are divided among and passed through the shareholders, who must then report the income or loss on their own income tax returns.
54. A limited liability company combines some of the characteristics of an S corporation with those of a partnership. The owners and managers enjoy limited liability, but the income or losses can usually be passed through to the shareholders without having to conform to the restrictions imposed on S corporations.

Tax contacts

Global

Michael Swanick
Partner, Global Pharmaceutical and Life Sciences Tax Leader
PricewaterhouseCoopers (US)
michael.f.swanick@us.pwc.com
[1] 267 330 6060

John Kelly
Partner, European Pharmaceuticals and Life Sciences Tax Leader
PricewaterhouseCoopers (Ireland)
john.m.kelly@ie.pwc.com
[353] 1 792 6307

Territory

Argentina
Ricardo D. Tavieres
[54] 11 4850 6722

Australia
John Cannings
[61] 2 826 66410

Belgium
Thierry Vanwelkenhuyzen
[32] 2 710 7422

Bolivia
Roberto Viscafe
[591] 2 2408 132

Brazil
Cristina Medeiros
[55] 11 3674 2249

Canada
Gord Jans
[1] 905 897 4527

China
Betty Ko
[86] 21 6123 3380

Daphne Su
[86] 21 2323 3117

Chile
Julio Pereira
[56] 2 940 0103

Colombia
María Helena Díaz
[57] 1 635 1125

Nacira Lamprea
[57] 1 634 0555

Czech Republic
Radmila Fortova
[420] 2 5115 2521

Denmark
Erik Todbjerg
[45] 3 945 9433

Ecuador
Pablo Aguirre
[593] 2 2564 142 361

Finland
Aki Blomqvist
[358] 9 2280 1747

France
Loic Le Claire
[33] 1 57 57 45 51

Germany
Volker Booten
[49] 89 5790 6347

India
Sanjay Kapadia
[91] 22 6669 1444

Indonesia
Ay Tjhing Phan
[62] 21 528 90658

Ireland
John M Kelly
[353] 1 792 6307

Israel
Gerry Seligman
[972] 3 795 4 476

Italy
Domenico Coldani
[390] 2 9160 5800

Japan
Shogo Yamada
[81] 6 6479 6664

Korea
Henry An
[82] 2 3781 2594

Luxembourg
Alina Macovei
[352] 49 48 48 3225

Mexico
Rubén Guerra
[52] 55 5263 6051

Netherlands
Erik Bouwman
[31] 20 568 4950

Peru
Humberto Allemant
[51] 1 211 6506

Poland
Mariusz Ignatowicz
[48] 22 523 4795

Portugal
Leendert Verschoor
[351] 213 599 642

Russia
Alina Lavrentieva
[7] 495 967 6250

Singapore
Abhijit Ghosh
[65] 6236 3888

South Africa
Mark Badenhorst
[27] 11 797 4641

Spain
Rafael Rodríguez Alonso
[34] 91 568 4287

Sweden
Magnus Pantzar
[46] 8 555 33 141

Switzerland
Markus Prinzen
[41] 58 792 5310

Taiwan
Eliott Liao
[886] 2 2729 6217

Thailand
Kulvech Janvatanavit
[66] 2 344 1352

Turkey
Zeki Gündüz
[90] 212 326 64 10

United Kingdom
Andrew Packman
[44] 1895 522104

United States
Michael Swanick
[1] 267 330 6060

Dante Giannini
[1] 408 817 3883

For further information, please contact:

Global

Simon Friend
Partner, Global Pharmaceutical and Life Sciences Industry Leader
PricewaterhouseCoopers (UK)
simon.d.friend@uk.pwc.com
[44] 20 7213 4875

Steve Arlington
Partner, Global Pharmaceutical and Life Sciences Advisory Services Leader
PricewaterhouseCoopers (UK)
steve.arlington@uk.pwc.com
[44] 20 7804 3997

Michael Swanick
Partner, Global Pharmaceutical and Life Sciences Tax Leader
PricewaterhouseCoopers (US)
michael.f.swanick@us.pwc.com
[1] 267 330 6060

United States

Anthony Farino
Partner, US Pharmaceutical and Life Sciences Advisory Services Leader
PricewaterhouseCoopers (US)
anthony.l.farino@us.pwc.com
[1] 312 298 2631

Europe

Jo Pisani
Partner, Pharmaceuticals and Life Sciences, Strategy
PricewaterhouseCoopers (UK)
jo.pisani@uk.pwc.com
[44] 20 7804 3744

Sandy Johnston
Partner, European Pharmaceutical and Life Sciences Advisory Services
PricewaterhouseCoopers (UK)
sandy.johnston@uk.pwc.com
[44] 20 7213 1952

Asia Pacific

Sujay Shetty
Associate Director, Pharmaceutical and Life Sciences Advisory Services
PricewaterhouseCoopers (India)
sujay.shetty@in.pwc.com
[91] 22 6669 1305

Beatrijs Van Liedekerke
Director, Pharmaceutical and Life Sciences Advisory Services
PricewaterhouseCoopers (China)
beatrijs.vanliedekerke@cn.pwc.com
[86] 10 6533 7223

John Cannings
Partner, Australia Pharmaceuticals and Life Sciences Leader
PricewaterhouseCoopers (Australia)
john.cannings@au.pwc.com
[61] 2 826 66410

Marketing

Attila Karacsony
Director, US Pharmaceutical and Life Sciences Marketing
PricewaterhouseCoopers (US)
attila.karacsony@us.pwc.com
[1] 973 236 5640

Marina Bello Valcarce
Global Pharmaceutical and Life Sciences Marketing & Knowledge Management
PricewaterhouseCoopers (UK)
marina.bello.valcarce@uk.pwc.com
[44] 20 7212 8642

pwc.com/pharma2020