



THE ECONOMIC IMPACT OF THE ROȘIA MONTANĂ GOLD PROJECT IN ROMANIA

September 2009



Oxford
Policy
Management

Acknowledgements

This report has been prepared by an Oxford Policy Management (OPM) team comprising Mark Essex, Alan Roe, Matthew Powell, Jeff Round and Clare O'Brien. The key authors of this work were Mark Essex and Alan Roe from OPM and Dr Jeff Round from the University of Warwick. Mark Essex leads OPM's work on extractive industries and is an economist with ten years' experience in relevant fields of work, including more than six spent working in developing countries. He is currently managing OPM's work as a validator of the Extractive Industries Transparency Initiative (EITI) in various countries, and has recently managed the team that completed the first EITI Validation in Africa (Liberia). Alan is a Board Director of the company and has spent 10 years as a Principal Economist at OPM, leading the work on macro-economics. Prior to joining OPM, he was the Principal Economist in the World Bank's Europe and Central Asia Department. Alan has a long-standing relationship with the University of Warwick, where he taught macroeconomics and previously held the post of Chairman of Economics. Dr Jeff Round (University of Warwick) is an acknowledged international expert on input-output and computable general equilibrium (CGE) modelling. He has undertaken work in these areas for OPM in connection with the analysis of the Chad-Cameroon oil pipeline project.

For the past five years, OPM has been the lead contractor to the International Council on Mining and Metals (ICMM) for its high profile Resource Endowment initiative (REi).¹ Through its three phases, the REi itself has made a genuine impact on the debate about the role of mining in lower income and transition countries and, in particular, has provided the industry with a much firmer base from which to address the earlier strong criticisms based around the propositions of the so-called 'natural resources curse'. In addition to the REi work, OPM recently undertook a unique case study for the ICMM and World Gold Council, looking at the future effects of gold mining on the Tanzanian economy. This study involved an assessment of the effects of gold mines over their entire lifespan, from construction to closure. This study made use of actual company data (historical and projected) for nearly all the major gold mines in Tanzania. In addition to the work for the ICMM, OPM has also undertaken a number of macroeconomic and social impacts studies for private companies, including a study of a large bauxite mining project in Guinea.

The team would like to extend its sincere thanks to the project team at Gabriel Resources for their generous help, support and encouragement during the assignment. We were asked to produce the report against a tight deadline and that would not have been possible without sustained support. Thanks are due, in particular, to Joel Bell for his initial in-depth briefings about the project and, thereafter, for his calm guidance about the available information that has been needed to produce this report. We are also grateful to Derrick Weyrauch, both for providing a formidable volume of relevant statistical information and then for helping us in the understanding of this.

We emphasise that the results and conclusions from the analysis are our responsibility alone. OPM, as the consultant firm responsible for this assessment, has no financial interest in any mining company and has undertaken the present assignment on the basis of strict objectivity and independence.

¹ A great deal more detail about the various phases of the REi and its numerous publications can be obtained from the ICMM web site (www.icmm.com).

Executive summary

Overview

This report provides a comprehensive *macroeconomic impact* assessment of the proposed Roșia Montană mine that is to be constructed and operated by S.C. Roșia Montană Gold Corporation S.A. (RMGC). This assessment and the early stages of work on the Roșia Montană gold mine come at a difficult time for the Romanian economy. This is because today's global crisis has already caused a major decline in the pace of the country's previously rapid economic growth. The economic context is now one of the worst recessions that Romania has suffered for many years. This does, however, mean that the significance of this large project, in terms of various macroeconomic contributions, is now much greater than was thought to be the case even one year ago.

This present assessment addresses, narrowly, the likely *macroeconomic impacts* of the Roșia Montană project (RMP). It is *not* an objective of this present report to assess the local *microeconomic and social impact* of the mine in the localities that are in the 'directly' and 'indirectly' impacted areas of the mine workings. Clearly, the effects on the directly affected communities are extremely important, and further work to build on the environmental impact assessment (EIA) will be addressed by RMGC during future planning work.

The report is presented in five main sections:

A summary profile of the project (Section 2);

- The country-context for the project (Section 3);
- The quantification of all the major macroeconomic impacts that can reasonably be expected from the project (Section 4);
- The economic rates of return associated with the project and the estimated returns to the domestic economy (RDE) (Section 5); and
- A summary of main results (Section 6).

Context

The main contextual points from Section 3 are that:

- because of the recent recession, the construction and initial operating stages of the RMP will now coincide with a potentially prolonged period of negative, flat or limited growth in gross domestic product (GDP). *This could render the potential contributions of the project to the country even more significant than was earlier anticipated;*
- due to the ore profile of the mine, where higher grade gold is accessed during the early years of the project, the greatest contributions to government revenues, foreign exchange and broader economic activity come during this critical economic period for Romania;
- although standards of governance have improved significantly in Romania, the assessment from the World Bank's *Doing Business 2009* survey provides a number of warning notes about the delays and other difficulties that the project may expect to encounter and which, collectively, could reduce the overall impact of the project;

- the major structural reforms necessary in the mining sector of Romania, especially since 1997, have been traumatic, with the need to close 520 of the 650 mines existing at that date. In this process, the number of mining employees was halved, but few other activities were initiated to provide alternative employment or mitigate social hardships in the mining regions; and
- the areas impacted by the new Roșia Montană mine have suffered particularly badly as a result of this mining reform process. At the narrow community level of Roșia Montană itself, the number of people in employment in April 2009 is estimated at only 19% of the active population. The remaining 81% comprise those officially registered as unemployed (14%) and thus receiving financial aid, and a large number of other unemployed people who do not receive any financial assistance (67% of the active population). It is estimated that around 17.2% of the population live on less than \$2 per day, and it is expected this figure could worsen in 2009, as an even smaller proportion of those unemployed will receive financial aid when benefits paid to retrenched miners finally come to an end.

In order to keep this executive summary concise, the remaining sections focus on the summary of the results from Sections 4 and 5 of this report.

Table ES.1 Results on direct macroeconomic impacts

National baseline	Section	Life of mine impact	Key dates	Annual averages	Annual significance	Discounted present value (5% and 10%)	Multiplier significance
Foreign Direct Investment Total FDI into Romania in 2008 \$13.4 bn	4.1	\$2 bn over life of mine	\$1300 mn over 2-year construction period	1st year construction \$440 mn 2nd year \$860 mn	\$1600 mn to complete construction, equivalent to 12% of 2008 total FDI flows	N/A	N/A
Foreign exchange earnings Current account deficit \$25.2 bn in 2008	4.7	\$7.5 bn in exports over life of mine \$4 bn contribution to BoP over life of mine	Year 1 export earnings of \$548 mn (at \$900 an ounce) Year 3 \$667 mn	Net foreign exchange earnings average \$479 mn p.a. during first 5 years and \$300 million p.a. over the operational life of the mine	Year 3 exports equivalent to 1.3% increase in Romania's 2008 goods export level	N/A	N/A
Revenues paid to government Total government revenues 2008 \$66.1 bn Total taxes \$57.4 bn	4.4	\$1.72 bn over life of mine (undiscounted multiplier effects increase revenues by \$6.8 bn)	Peak year: Year 11, \$166 mn	\$95 mn p.a. for 18 years	Year 11 payments equal 0.25% total government revenues	NPV \$1075 mn at 5% \$719 mn at 10%	Government revenue multiplier 4 times direct contribution ⁽¹⁾

GDP and GNI GDP 2008 \$202.74 bn	4.2	GDP could be 3% higher with the project than without it. Equivalent to \$6 bn over life of mine Including multiplier effects, GDP could be 9% higher with the project than without it. Equivalent to \$19 bn over life of mine	N/A	Direct effect 0.1% to 0.3% addition to GDP p.a.	N/A	N/A	Multiplier effects 3 times greater than the direct effects. e.g. 0.84% addition to GDP in Year 3
Employment 2006 national labour force 9.32 mn	4.5	Employment to Year 27	N/A	Construction 2,337 Romanian workers; 881 operations	N/A	Average monthly salaries \$1,233	4 to 4.5 times
Environment, infrastructure and community benefits	4.9	\$280 mn	Many assets are of immediate benefit to community early project life	N/A	N/A	\$177.9 mn at 5% \$129.6 mn at 10%	N/A
Economic Rate of Return and Returns to the Domestic Economy (RDE)	5	\$2.4 bn over life of mine	N/A	N/A	RDE 80% greater than financial return to the project	RDE \$1.5 bn at 5% \$1.02 bn at 10%	N/A
Financial Rate of Return	5	\$2.2 bn over life of mine	N/A	N/A	N/A	\$563 mn at 10% \$242 mn at 15%	N/A
Poverty	3.4 and Annex A	<ul style="list-style-type: none"> 81% of the active population in Roșia Montană unemployed. Only 14% receive financial aid, many of whom will stop receiving financial aid in 2009 as unemployment benefits to ex-miners ends; 17.2% of Roșia Montană population lives on less than \$2 per day; Women have suffered disproportionately from secondary impacts of mine closure, as rates of domestic violence and divorce increase, and the burden of child care increasingly falls on women as household incomes fall and pre-school facilities are no longer affordable; While laid-off miners experienced the largest probability of a welfare decline, their higher incomes and severance payments meant they certainly were not the hardest hit. In fact, it was the livelihoods of the workers indirectly servicing the mines (indirect and induced labour) that were more harshly affected by mine closure because these workers rarely received any compensation; The effect on large numbers of families either directly or indirectly impacted by the closure of the mines has increased health problems. High incidence of poverty causing, for example, high fat diets, stress, depression and alcoholism is widely documented (see Annex A). 					
Governance standards	3.2	<ul style="list-style-type: none"> RMGC have a vested interest in good governance because its absence can severely delay projects and reduce profitability. Strong institutions of government lie at the core of the task of actually realising the potentially positive contributions that the mining sector can make to broad-based development and poverty reduction. RMGC plans to work with the community and NGOs to strengthen good governance through initiatives to increase transparency and use of participatory techniques in monitoring and evaluation. 					

Note: (1) Output (or inter-industry) multipliers indicate the government revenue multiplier could be 2.5 to 2.75 times greater than the direct taxes paid. Crude estimates on additional revenues received by government due to economy-wide effects on increased household income and expenditure give rise to multipliers possibly up to 4 times the direct RMGC tax contribution.

- **Foreign Direct Investment (FDI).** During the initial years of the project, there is a large boost to FDI, with the capital cost to completion totalling \$1,600 million; this is followed during the project's life by a further \$503 million in sustaining and closure capital investment. This estimate of the cost to completion is the equivalent of about 12% of the total FDI flow into Romania in 2008, or around 55% of the existing stock of FDI in the mining sector in 2007. During the two main construction years, there will be an expected inflow of capital to the economy of \$1,300 million in debt financing.
- **Balance of payments (BoP).** After FDI, the next most important BoP component is the annual flow of new *export earnings*. These foreign exchange earnings occur immediately with the start of production; exports peak in Year 3 at around \$667 million (in 2008 prices), and deliver gross annual average foreign exchange earnings of some \$468 million over the 16 operational years of the project. These sums represent **1.3% and 0.9%**, respectively, of the total export earnings of all goods from Romania from all sectors in 2008. Although these earnings are offset by enlarged imports, there will, nonetheless, be an export surplus that averages \$393 million per annum from the project in all years excepting only the two construction years (see Figure 4.22). Because dividends do not start to be paid until Year 6, the average net contribution over the first five years of the operational period to the current account balance is around \$479 million per annum. Even after accounting for debt servicing and dividends paid abroad, the average net contribution to the current account balance over the 16-year operational life of the mine will be around \$300 million per annum.² This contribution can be compared with Romania's large existing and crisis-affected current account deficit of more than \$25.2 billion in 2008. The average annual foreign exchange earnings over the 16-year life of the project will contribute the equivalent of around 1.2% of that present deficit.
- **Government revenue.** The project has an immediate positive impact on government revenues and, over the life of the project, a total of \$1.72 billion will be paid in both taxes and dividend payments in 2008 constant dollar terms. In terms of understanding what a figure of this size means today, if this total is discounted at 10% then the NPV is \$719 million and, if discounted at 5%, is \$1,075 million.³ The revenues paid to the government average \$103 million per annum over the first 10 years of operational life and \$95 million per annum over the main 18-year period. The total annual revenue paid to the government is expected to peak at \$166 million in Year 11, largely because of taxes paid of \$112 million and a dividend payment of \$54 million to a government owned entity.
- The largest payments are in the form of social security payments, royalties, the withholding tax, income tax and, in time, significant payments from dividends on the government's equity share of the project. The tax take alone over the project's life varies from between **0.1% and 0.2%** of the government's likely tax revenues, and the dividend in Year 11 pushes this to around 0.25% of the estimated total revenues received by government in that year. So, while the sums involved are large in *absolute* terms, they cannot be considered particularly large relative to the government's comparatively broad overall tax capacity. A better indication of the project's significance considers the country's fiscal deficits, which are at present severe. In the first year of project operation (assumed to be 2013), the total taxes paid by the project of \$63.6 million are the equivalent of **1.7%** of the anticipated gross financing need of the government, increasing to 2.2% by the third year of operation (see Figure 4.10). So, in this and the other early years, the project could be crucial in creating 'fiscal space' to help accommodate some of the social and other economic difficulties now facing the country.
- **Gross domestic product (GDP) and gross national income (GNI).** A major *direct* GDP (and GNI) effect will come immediately with the start of the project from the significant proportion of goods and services bought in Romania: a portion of this spending will create value-added in the form of local wages and profits in the supplying firms and, thereby, a contribution to GDP (and GNI).⁴ During the construction period, an average of \$194 million will be spent each year on goods and services in Romania. Also, starting from Year 1 of operations, the Romanian spend will average \$96 million per

2 Over the mine life it is estimated this will total over \$4 billion (undiscounted).

3 For illustrative purposes, it is useful to discount the revenue stream from the project on a Net Present Value (NPV) basis by using a social discount rate. Because Romania is a mature industrial economy, a discount rate of 5% is entirely appropriate; however, given the high levels of poverty and very low income levels in rural Romania, and in the project affected area in particular, a higher discount rate of 10% is also justifiable.

4 The additional value-added created in supplier firms could be defined as a 'first round indirect effect' of the project although, in this context, is considered together with the other more overtly direct contributions to GDP.

annum. Another key contributor to GDP (and GNI) will be the labour employed during the 18-year project life. The total expatriate and Romanian direct wage cost will average some \$63 million per annum during the construction period, which then falls to \$23 million during the operational period. Removing the expatriate labour (on the conservative assumption that such workers in Romania will remit all of their earnings abroad) somewhat reduces the effect on GNI, although only by a small amount due to the limited numbers of expatriates employed in the project. A further contribution to GDP involves the profit or income that is generated by the activities of the mine calculated before the deduction of interest payments, dividends or tax payments to government. Ultimately, the project's typical direct annual contribution to GDP (and GNI) has been estimated at somewhere between 0.1% and 0.3% of total GDP (and GNI). These are not large *annual* numbers but, since they are sustained over a long period of time, their cumulative effect is significant. We estimate that over the life of the mine the cumulative direct GDP contribution could be around 3%, the equivalent of \$6 billion. Furthermore, the multiplier effects of the project are likely to increase these sums by an even greater amount, with the largest contributions to GDP arising early in the operational life of the project. In a typical project year, it could be 0.51% of GDP but, at its peak (Year 3), the project could contribute around 0.84% of GDP. Also, in terms of growth an uplift of this order is numerically important and over the life of the project GDP could be 9% higher with the project than without. This would be the equivalent of around \$19 billion. The GNI numbers, in absolute terms, will be somewhat smaller over time because of the outflows of interest, dividends and some part of the expatriate wage payments (see Figure 4.1).

- **Employment.** During the initial two-year *construction phase*, 2011–13, the estimated Romanian labour demands of the project reach their peak. At that stage, **2,391 workers in total** are estimated to be required, of which 2,337 will be Romanian workers who will be either *employed* directly or *contracted* directly by the company. This period of intense construction and mine activity will generate a wage bill (for foreign and Romanian workers) in excess of \$63 million per annum, much of which will be spent locally on various household and consumer related goods and services. In the operational years of the project, the numbers directly engaged will be some **881 Romanian workers**, with a total wages bill, on average, of around \$22 million per annum. The engagement of large numbers of foreign staff is not anticipated. Some 1,745 of the new jobs during the construction period are estimated to be filled by persons from the *local* and *regional* areas of Roșia Montană. *This is a large demand, viewed against the total populations of the immediate communities affected by the mine.*

Results from the multiplier analysis

The estimates of the direct project impacts described in Section 4 have been augmented by in-depth calculations of the likely indirect and induced effects of the project. The results are largely what one would expect for a relatively industrialised and diversified economy such as Romania. The domestic economy has the capacity to supply a wide range of the goods and services likely to be required by the project – even some of the more sophisticated equipment and chemicals, for example.

- **Gross output multipliers** are estimated at around **3.5 (construction phase) and 3.0 (operational years)**. However, it is prudent to somewhat discount the values of the earlier years on the grounds there will be some inevitable lags while local industries gear themselves to provide outputs at a significantly higher level than in the immediate past. A wide range of Romanian industry will be impacted. In the construction phase, the main beneficiary industries are equipment supply and construction. In the operational phase, the main beneficiary sectors are power, construction (earth moving), food and agriculture; however, many other sectors receive boosts to their output in excess of \$5 million per annum (see Table 4.1).
- **Household income multipliers** are estimated to be somewhat higher than the output multipliers, with values over the life of the project being typically around **4.0 (construction period) to 4.75**.
- **Employment multipliers** are estimated to be in the region of **4.0 to 4.5**. The indirect employment numbers in some of the 16 operational years are estimated to be in excess of 3,000 people, as against the direct employment numbers of 881 people (full-time equivalent). Theoretically, this would take the total direct, indirect (and induced) job creation attributable to the mine to around 3,500 to 4,000 people.

- **Government revenue multipliers** are likely to increase the direct revenue contribution of the RMP by around **2.5 to 2.75 times**, as firms benefiting from increased production to supply the mine spend their additional incomes on other goods and services that are themselves taxed (these are the 'indirect' effects). In addition to the inter-industry effects, the boost to the wider economy comes from increased income and consumption at the household level (these are the 'induced' effects). Therefore, the overall impact of direct, indirect and induced effects from the project on government revenues might be as high as **4.0 times** the revenue contribution of the RMP.
- **Government re-spending multipliers** are also likely to have an impact on the wider economy and, in turn, tax receipts, if over time the government decides to spend the additional \$1.72 billion in revenues received by the project. Given the seriously impaired state of Romania's public finances, we have assumed very conservatively that the priority will be to use any additional revenues for the purposes of deficit reduction, rather than to boost expenditures. This is a strong and more limiting assumption, but realistic for the short term in the present circumstances. However, insofar as it is unrealistic for the later project years, we are under-stating the indirect effects of the project.

The economic returns from the project

The individual macro effects – direct and indirect – as listed above are all important in their own ways, and will all contribute to redressing some of the immediate economic difficulties that Romania faces in the aftermath of the global financial crisis. The *Economic Return* calculations draw the main constituent items together to provide a simple *numerical* assessment of the overall economic impact of the project. This part of the analysis shows that:

- the narrow financial returns from the project are significant. Based on the financial modelling that has been carried out, the likely NPV on a cash flow basis, assuming a cost of capital of 10%, will be about \$563 million; assuming a 15% cost of capital, the likely NPV will be around \$242 million. This implies an internal financial rate of return to the project (IFRR) of 22.5%.⁵
- the most substantial of the returns to the domestic economy (RDE) are the \$1.72 billion of **taxes and other government revenues** that will accrue wholly to the nation and so need not be treated as a reduction of cash flow, as they are in calculating the IFRR. Even using a relatively high social discount rate of 10%, this benefit has a value to the economy in NPV terms of \$719 million and, using a social discount rate of 5%, is around \$1,075 million.
- the next most significant component of the RDE is that associated with the **employment of otherwise unemployed or underemployed labour** in the areas in or around Roșia Montană. We estimate this benefit as having an NPV of \$70.2 million (the direct employment benefit) and a further \$45.5 million (from the indirectly created new employment). Using a discount rate at 10%, this produces a total of approximately \$115.7 million; using a 5% discount rate, this equates to \$164.6 million.
- in addition, an estimated benefit of \$57.2 million in NPV terms at 10% can be expected from the **additional incomes** (e.g. profits) in those firms that expand as an indirect result of the project's own direct spending and the indirect spending generated in the multiplier process (using a 5% discount rate, this increases to \$78.7 million).
- finally, there will be large net gains from the various **environmental, infrastructure and community expenditures** of the project. These have been estimated on a conservative basis. But, nonetheless, they yield a contribution to total RDE of more than \$129.6 million in NPV terms at a 10% discount rate, and \$177.9 million at 5%. Some of the prospective benefits, such as those associated with the acid rock drainage (ARD) programme, could be larger than the expenditures alone might indicate.
- overall, it is estimated that the total RDE (returns to the domestic economy) in NPV terms, and using a social discount rate of 10%, will amount to around **\$1,023.3 million and at 5% around \$1,498.6 million**.

⁵ The IFRR of the project as a whole will be greater than the financial return to investors. This is because the dividends paid to a government entity, which receives an equity interest with no up-front cost, reduces the overall amount payable to private investors.

- we cannot compute an IRR equivalent for these benefits to the domestic economy, since there is no capital cost incurred by the nation to acquire the project. However, we can note that the NPV of these benefits at over \$1 billion are sufficiently large so as to ensure that the nation is able to appropriate a *high absolute value* from the conduct of the project. Further separate work has been undertaken to measure the fairness of the relative shares of shareholders and the nation.

Overall

This present assessment of the impacts of the Roșia Montană project confirms earlier findings that it has great potential to provide a significant economic return to the people of the area and to the nation more generally. However, the emphasis in this study on numerical quantification should not hide the fact that there is a great deal of patient organisational and other work needed to turn this potential into reality. The realisation of the full multiplier effects, for example, will probably require new investment in local infrastructure, and imaginative new forms of technical and financial support to local industries to enable them to respond as fully as possible to the needs of the project. It is also likely to need improved revenue arrangements that can help to empower local and regional governments to play their part alongside the project sponsors on a genuine partnership basis. Improved partnership arrangements with a wide range of Romanian and international stakeholders could also be helpful. In all this, the project itself should be seen as the catalyst that can pump-prime a large improvement in local economic and social conditions, and not as the sole force in that process of change. As was noted at the end of a comprehensive assessment carried out by the University of Alba in early 2007:

the completion of the project proposed by RMGC is not in contradiction with other projects of economic development of the zone, but moreover, it can act as a catalyst of such projects (2007, p. 128).

Abbreviations

ARD	Acid Rock Drainage
EBRD	European Bank for Reconstruction and Development
EIA	Environmental Impact Assessment
EITI	Extractive Industries Transparency Initiative
ERR	Economic Rate of Return
FDI	Foreign Direct Investment
FRR	Financial Rate of Return
GBU	Stock Market symbol for Gabriel Resources
GDP	Gross Domestic Product
GNI	Gross National Income
HDI	Human Development Index
ICMM	International Council on Mining and Metals
ILO	International Labour Office
IRR	Internal Rate of Return
IFRR	Internal Financial Rate of Return
IMF	International Monetary Fund
NEER	Nominal Effective Exchange Rate
NPV	Net Present Value
OPM	Oxford Policy Management
RDE	Returns to the Domestic Economy
REER	Real Effective Exchange Rate
RMP	Roșia Montană Project
RMGC	S.C. Roșia Montană Gold Corporation S.A
SME	Small and Medium Enterprise
UNCTAD	United Nations Committee of Trade Aid and Development
UNDP	United Nations Development Programme

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1 Introduction

1.1 Objectives

This report provides a comprehensive *macroeconomic impact* assessment of the proposed Roșia Montană mine that is to be constructed and operated by S.C. Roșia Montană Gold Corporation S.A. (RMGC). The planning for this mine has been underway for several years. For the purposes of modelling the potential macroeconomic impacts of the project, it has been assumed that construction will take place beginning in 2011.⁶ Once in operation, the mine is expected to produce an annual average output of some 495,000 ounces of gold and 1,790,000 ounces of silver for a period of about 16 years.⁷ This will represent a substantial increase on Romania's present levels of mineral production, and will certainly have macroeconomic consequences of some significance during the period.

This assessment and the early stages of work on the Roșia Montană gold mine come at a difficult time for the Romanian economy. Romania, as a satellite state of the USSR, suffered a large economic downturn and need for major structural transformation once the Soviet empire collapsed in the late 1980s. But, from about 1998 onwards, and encouraged by the prospect of EU accession, there was a strong rate of economic growth that continued until the global recession struck in 2008. However, at the time when the global financial crisis began in 2008, many aspects of Romania's transition to a market economy remained significantly incomplete. As both EBRD and World Bank analysis demonstrates (see Section 3), Romania in 2009 remains a relatively difficult country in which to conduct private business. This fact has a bearing on the prospects for the mine.

Today's global crisis has already caused a major decline in the pace of the country's economic growth: initial expectations were for a decline of around 4% in 2009, recovering to about zero growth in 2010.⁸ However, recent information from the July 2009 IMF mission to the country suggests that the country is facing an immediate and much larger contraction of economic activity – probably 8% or more in 2008/09.⁹ This major recession is expected to be associated not only with a significant slow down of the flows of new inward investment, but also with a large fiscal deficit equivalent to 8% of GDP. By April 2009, this worsening economic situation had persuaded the government to seek financial support from the IMF, in the form of a stand-by agreement. That was forthcoming in a programme that in total involves almost €20 billion of international financial support in April 2009.¹⁰

This, then, is the broad economic context in which the final stages of work on the review of the Roșia Montană project (RMP) are being carried out and the results assessed. In this major current recession, the significance of this large project in terms of various macroeconomic contributions – for example, to GDP, to government revenues and to employment – is now much greater than was thought to be the case even one year ago. These macroeconomic contributions alone cannot make the definitive case for the project going ahead – the significant social and environmental impacts are also critically important. But these macro contributions need to be properly documented and well understood as the definitive case is considered both by the Romanian authorities and by the company and its financiers. It is the central purpose of this present report to fill this key gap in the extensive studies that have already been conducted about the project.¹¹

6 The actual start date for construction is not confirmed, but is unlikely to start in 2010; therefore, 2011 has been used in the calculations reported in this document.

7 The production estimates for gold average 494,617 ounces per annum and, for silver, 1,791,864 ounces per annum. Throughout this document a conversion rate of 31.103 grams = 1 troy ounce has been assumed.

8 Source: IMF, *World Economic Outlook*, various issues and updates between October 2008 and April 2009.

9 The figure indicating a 4.1% fall for 2009 and prediction of flat growth in 2010 is from IMF, *World Economic Outlook*, table A4, April 2009, p. 194. The 8% figure is from Romania's finance minister Gheorghe Pogea, quoted on Thursday 30 July 2009.

10 This stand-by agreement is for a period of 24 months in an amount equivalent to SDR 11.443 billion (€12.95 billion). It has been provided in conjunction with further support of €5 billion under the EU's balance of payment financing facility and other multilateral commitments of some €2 billion.

11 The other studies include the detailed geological and related technical work, a multi-volume environmental impact assessment (EIA)

The basis of this report is the March 2009 Canadian National Instrument 43-101 Technical Report on the RMP. The following changes were made to assumptions within the economic analysis of the Technical Report for the purposes of this study:

- modified revenue assumptions were made for gold and silver to approximate current prices of \$900 per oz (from \$750 per oz) and \$12.50 per oz (from \$10.50) respectively; and
- third-party debt has been assumed to be paid out using all available funds as generated.

1.2 Scope

This present assessment addresses the likely *macroeconomic impacts* of the RMP. For the reasons briefly touched upon, it is important for all stakeholders to have an available comprehensive assessment of the probable effects of the project on Romania's future GDP and GDP growth rate, on its balance of payments, on public finances, on employment and on the macroeconomic condition of the economy more generally. The assessment presented in this report seeks to define and measure not only the *direct* effects of the project on the various components of macro performance, but also some of the *indirect and induced* effects that might reasonably be expected. The report provides that assessment for both the two-year *construction* phase, the longer *operational* phase of 16 years and the *closure* period of nine years: a total period of some 27 years.

In the time available for this assignment, it has not been possible to attempt any formal *equilibrium modelling* of the project's effects on the economy. However, and based on our experience of similar work on other large mining projects, the availability of such a model would be unlikely to add fundamentally to the insights achievable using the simpler analytical techniques, including multiplier analysis, as employed here.

To every extent possible, the report also attempts to connect the main results with the record of Romania's past macroeconomic performance and of its current macroeconomic difficulties. This should enable the reader to obtain an idea about the contributions that the RMP can make, potentially, to improving the current recession-affected economic situation.

It is *not* an objective of this present report to assess the local *microeconomic and social impact* of the mine in the localities that are in the direct and indirectly impacted areas of the mine workings. We recognise immediately that these issues are extremely important. They certainly need to be factored in as a part of the overall assessment of the project. A closer analysis of that work will be carried out separately to supplement the socio-economic data and analysis of the earlier EIA. The government review of the EIA was halted in 2007. That earlier assessment has included some of the relevant base-line and other key data for this work. Furthermore, some independent studies – and, notably, a large multi-disciplinary assessment produced by a team from the University of Alba in 2007 – have provided comprehensive documentation on some key issues.¹² However, further studies of the critical socio-economic condition of the area, and how the project can help to ameliorate this, will be undertaken as the project plans are further developed and implemented.¹³ Such a study could seek to provide the factual platform for a sustained and high-quality conversation between all the affected stakeholders about the most appropriate ways by which to maximise the longer-term economic and social benefits of the mine for the people of Roșia Montană and the surrounding areas.

that was filed in 2006. Subsequently, as a result of the public consultation and trans-boundary consultation process, an Annex to the EIA was filed in May 2007.

12 These issues have included analysis of the extent of the displacement of local populations in the mine-affected areas of Roșia Montană itself, and in the towns of Abrud and Bucium and the communes that surround the mine area; the impacts on the local historical and cultural heritage of those areas; the numerous social and other initiatives introduced by the company to support the local communities (e.g. training, micro credit and other small business initiatives); the affects on local infrastructure; and the consequences of the project for local authority as well as state (national) finances.

13 That further work could bring together: a baseline assessment of the economic and social condition of the households that are likely to be impacted by the mine; a detailed listing of the various local impacts that will occur because of the Roșia Montană project, including an identification of the household groups that will be most affected; an evaluation of the new initiatives and partnerships (both by the company and by governments) that are being put in place to address particular concerns and to exploit new business opportunities; and suggestions about a monitoring and evaluation system that might be established to provide an ongoing assessment of the local social and economic impacts.

We note, in passing, that it is in the nature of large mining projects anywhere in the world that the major benefits tend to accrue *centrally* (i.e. at national level), whereas it is at the local areas of the mine that the major disruptions take place – hence the local controversies and complaints that almost always accompany the establishment of a new mine. Nonetheless, with proper design and management, a new mine can be an important catalyst for local economic development, even in a highly depressed region such as that around Roșia Montană. However, such successful outcomes require appropriate supporting policies from both local and national governments that can build synergistically on the activities that the mining company itself is prepared to undertake.

1.3 Outline

The Report is presented in five further sections as follows:

- Section 2 provides a summary profile of the project, including its history, the expected levels of capacity output, the geographical areas that it is likely to affect, its footprint of land use, and its consequences for the demands on local and regional infrastructure.
- Section 3 discusses the country-context for the project. This is to ensure the specific findings we draw about the project are firmly related to the realities of the present economic and social situation. With this firmly in mind, Section 3 begins with a slightly longer discussion of the recent and current economic circumstances of Romania. It then considers various aspects of the ‘governance’ of the country, which is important in assessing the likely pay-off to the project not only in narrow financial terms, but also in terms of the broader macro and micro effects that might be anticipated. Section 3 also provides a brief discussion of the condition and recent history of mining activity in Romania in general, and in Roșia Montană in particular. This provides one key element of the discussion that ends Section 3, on the poverty and human development status of the peoples in the area at regional, local and community levels.
- Section 4 provides the heart of the report by discussing and quantifying all the major macroeconomic impacts that can reasonably be expected from the project. This makes use of the raw operational data provided by RMGC, but interprets these data using standard economic concepts. Specifically the statistical analysis of project impact covers: GDP and GDP growth rates; the government’s fiscal position, including the regional and local budgetary impacts; the balance of payments on both current and capital accounts; and direct and possible indirect employment. The analysis of the balance of payments also incorporates a separate sub-section on the real effective exchange rate. The purpose of that is to enquire whether the project might lead to any Dutch disease type effects by causing excessive exchange rate appreciation. The sub-sections on GDP, employment and government revenues look explicitly at the likely magnitude of the multiplier effects. These also need specific consideration, in order to assess the full impacts of the project.
- Section 5 considers the economic rates of return associated with the project, and explains how these diverge from the narrower financial returns that are the main concern of shareholders in RMGC. This takes particular account of the higher rates of prevailing unemployment in the Roșia Montană region – a fact that justifies the use of an economic wage rate that is different to the actual wages being paid by the project. This will then account for the fact that the value to society of having an unemployed person working for RMGC is far greater than the direct financial cost to the company of employing an additional person.
- Section 6 summarises the key conclusions of the analysis.

2 Project profile

2.1 The Roșia Montană project

The project that is the subject of this assessment is owned and managed by S.C. Roșia Montană Gold Corporation S.A. (RMGC). This company, in turn, is 80% owned by Gabriel Resources of Canada. The company was registered in 1997 as S.C. Eurogold S.A. (Eurogold)¹⁴ but changed its name to RMGC in 1999.

The mining concession licence for the Roșia Montană mine was obtained in December 1998 from the National Mineral Resources Agency by Minvest (the license holder) and RMGC (subsidiary company).¹⁵ However, in October 2000, the licence was transferred from Minvest to RMGC, with Minvest as an affiliate holder.¹⁶ RMGC performs and finances all the mining and development activities related to the new project.

Figure 2.1 Location of Roșia Montană



14 That company had the following ownership: Gabriel Resources Ltd (Canada) – 80%; Copper Public Corporation of Deva (subsequently Minvest) – 19.31%; and for Cartel Bau, Foricon S.A. and Comat S.A., three minor shareholders, 0.23% each.

15 This was done under the authority of the new Mines Law of June 1998. The terms and conditions of the concessions provided explicitly for the transfer of the licence from Minvest – the incumbent and state-owned company – to RMGC, and also limited RMGC's involvement in, and liability for, the planned closure of the state-run mining operations that were then operating on the project site. The potential liabilities included things such as environmental clean-up and redundancy payments to retrenched miners. The project will include a rehabilitation of currently abandoned mine pits and the clean-up of polluted waters coming from the old mine works, thus reducing the related liabilities of the government company.

16 The Roșia Montană property is held under exploitation concession licence number 47/1999 and covers an area of approximately 23.883 km². The concession was published in June 1999, and has a 20-year term, with provision for successive five-year extensions.

The project involves the development of a gold mine located near Roșia Montană village in Alba County, about 80 km from the regional capital of Alba Iulia. The project lies within the so-called 'Golden Quadrilateral', which is an area situated in Transylvania within the Apuseni and Metaliferi Mountains linked to the Carpathians chain. This is an area of approximately 900 km² in the central-western part of Romania that has involved significant previous mining activity: specifically, the area has been mined for gold intermittently over a period of at least 2,000 years and, at many times, has been Europe's most significant centre for gold production.¹⁷ See also Section 3.3 (The role of mining in Romania).

A feasibility study, completed in 2001, concluded that the production of gold and silver from the site was economically viable, using conventional open pit mining, grinding and cyanide leaching of whole ore.¹⁸ This exploration work indicated the feasibility of utilising four ore-bearing open pits (Cetate, Cărnic, Orlea and Jig).¹⁹ Between January 1998 and May 2005, RMGC carried out extensive surface and underground exploration; the further geological work carried out since then has done little to change the earlier assessments. These suggest estimated proven and probable mineral reserve for the RMP of some 214.9 tonnes at average grades of 1.46 grams of gold per tonne and 6.88 grams of silver per tonne. The updated technical and economic review finalised for RMGC in 2009 indicates the possibility of processing the mineral reserves at a rate of between 13 and 15.5 tonnes per year. This would suggest a productive life for the mine as a whole (but not all four pits) of approximately 16 years.²⁰ It is useful to note that these annual production levels would be large relative to the existing total gold production of Romania. These decreased from 2.43 tonnes in 1999 to 1.60 tonnes in 2005.²¹

Infrastructure and the affected areas

The proposed project site is reasonably well serviced by existing infrastructure including electrical power, roads and telecommunications. With regard to road transport, access to the plant site will be from the existing Gura Rosiei–Roșia Montană road, which is north of the proposed plant site. With regard to power, an existing twin circuit 110 kV power line (operated by the local distribution company, Electrica S.A.) traverses the project site. This power line connects the existing Zlatna and Preparare (Roșia Poeni) substations. With regard to water, fresh water for the project can be provided from a pumping station on the Aries River and delivered through a 12.7 km underground pipeline. However, any railway infrastructure is largely absent.

There are a number of significant side issues that will affect the project as it moves ahead, especially in relation to the matter of water quality. As a result of the historical mining activities in the area of the project, abandoned open pits, waste dumps and tailings ponds exist on the Roșia Montană property. In addition, some 140 km of historical underground workings, some dating from Roman times, have been identified. Unfortunately, acid rock drainage (ARD) continues to be produced from the historical openings and dumps, and this drainage currently discharges, untreated, into local streams. This is one among several environmental areas the project intends to remediate, at no cost to the Romanian government, in redressing environmental degradation caused by 2,000 years of past mining practices.²²

17 The area attained its maximum development and peak production during the period of the Austro-Hungarian Empire from the end of the seventeenth century to the Great War of 1914–18. Significant underground openings were developed during this period, with the majority of mining carried out from underground workings over 400m of vertical elevation. Underground mining under the control of the Romanian Communist government began in the early 1960s. Open pit mining was undertaken initially at Cetate, and then began at Cărnic in the 1970s. The proposed new development would re-establish the area as one of Europe's largest gold producing facilities.

18 A pre-feasibility study in 1999 was conducted by Pincock, Allen & Holt (PAH). The feasibility study that began in 2000 was managed by GRD Minproc Limited (Minproc).

19 It is understood that mining will start simultaneously at the Cetate and Cărnic pits, but that the Cărnic mining is expected to terminate after nine years, while Cetate will continue until the working-out of the deposits. The mining within the Orlea and Jig pits is expected to start during the seventh and the ninth years of the project, respectively

20 Source: Coffey Mining Pty. Ltd. (Coffey Mining) and others, Technical report on the Roșia Montană Gold Project, Transylvania, Romania, March 2009.

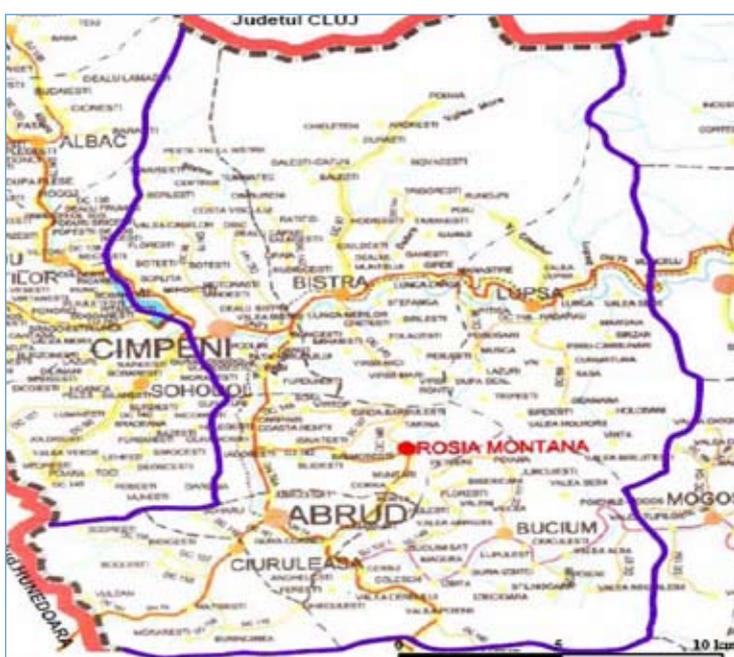
21 Source: University of Alba, 2007, p. 14.

22 We understand that it is the intention of the RMGC to treat these effluents as part of its normal operating procedures.

Land requirements and the affected areas

The project area will cover part of the mining concession of 1,258 hectares, of which approximately 16% (200 ha) will be needed as the working areas of the four pits. This includes some 95 ha that are already impacted directly by existing and previous mining activities. This land requirement will have its largest absolute impact on the administrative region of Roșia Montană where 1,050 ha (or 25% of the administrative area) will be involved. Outside this, the impacts will fall on the towns of Abrud and Bucium, and the communes that surround the mine area (Campeni, Ciuruleasa, Bistra, Lupșa and Mogoș). This is a traditional mining area, and the number of unemployed miners formerly engaged by the two state-owned companies (Minvest and RosiaMin) is high. The direct impact area covering these towns and communes is shown in Figure 2.2.

Figure 2.2 The Project impact area



The comprehensive study of the project conducted in 2007 by a team from the University of Alba suggested there will also be an extended impact area covering a distance of 'several tens of kilometres' further from the impact area. The full extent of this extended area is difficult to define in precise terms without the benefit of the detailed on-the-ground studies. However, the geographical extent of the area will be determined by several factors. Mainly, these will be the existing road and other communication links beyond the impact area itself, and the pre-existing social and economic relationships between communities inside, and somewhat beyond, the boundaries of the immediate area of impact. Any local social impact study that is conducted subsequent to this macroeconomic assessment will examine these issues in more detail. The present study merely identifies what may be possible.

Finally, we note that the economic situation of those in the mining-impacted area is presently extremely poor. At the community level (Roșia Montană) the number of people in employment is extraordinarily low and symptomatic of an extremely depressed area.²³ Specifically, the rate of employment is estimated in April 2009 at only 19% of the active population (those aged from 18 to 62). The remaining 81% of the active population comprise those who are officially registered as *unemployed* (14%) – and thus receiving financial aid of around \$3.3 per day, and a large number of unemployed people who do not receive any financial assistance (67% of the active population).²⁴ Furthermore, the proportion of unemployed people who do

23 The Romanian government has declared this area as an economically 'disadvantaged zone'.

24 Data provided by RMGC draws significantly on official statistics from the regional and national level, complemented by internal company data and knowledge of the local area.

not receive financial assistance will probably increase in 2009 as the payments to retrenched miners will be exhausted.

Similarly stark figures highlighting the levels of poverty in Roșia Montană are shown by the number of households receiving financial aid for heating (55%), although how this compares with other communities is not known. We understand that, to be eligible for financial aid for heating, families must have household incomes of less than \$6.52 per day per household member. If 55% of households are in this category, then some of these, at least, will be in *extreme poverty*. It is understood also that, after the closure of the two state mines in 2007, many displaced workers have remained as 'unemployed miners', rather than seeking alternative livelihoods. This is easy to understand, given the technical nature of the work and relatively high remuneration vis-à-vis subsistence agriculture and also the lack of other employment opportunities. However, it does mean that the new project enters an area where there should be plentiful supplies of workers.

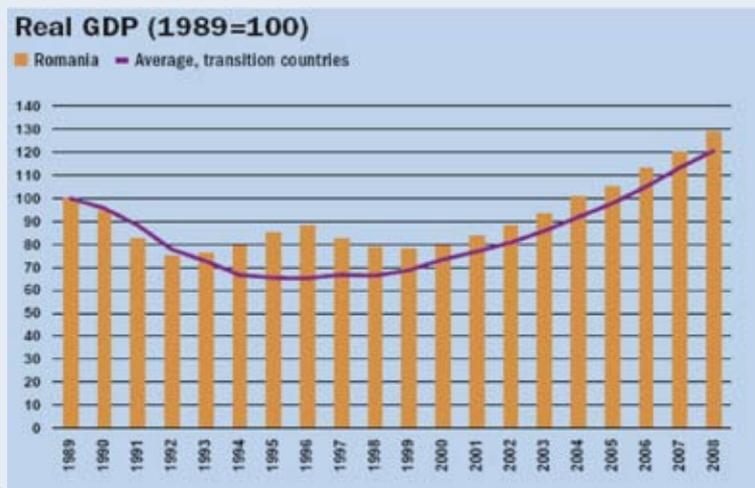
Section 3 and Annex A use national and local statistical sources to describe the nature of the socio-economic condition of the impacted areas in greater detail.

3 The country context for the Project

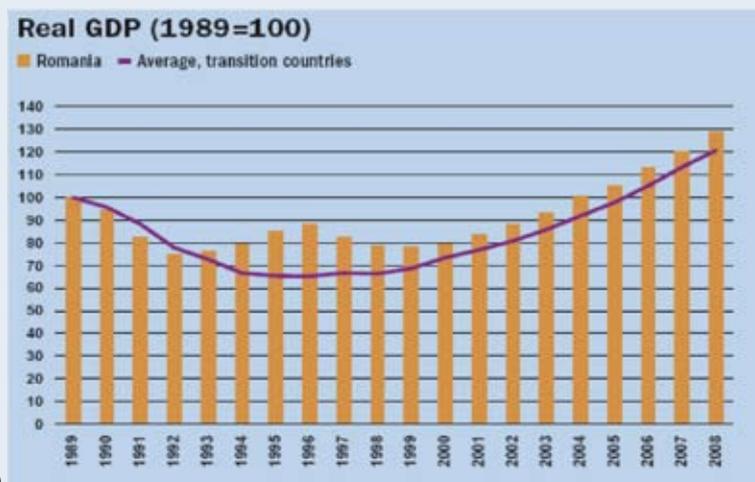
3.1 Economic performance

In common with the states of the USSR, Romania suffered a large economic downturn and the need for major structural transformation when the Soviet empire collapsed in the late 1980s. Box 3.1(a) provides a thumbnail overview of the extent of this impact on the country's GDP (1989–2008), and Box 3.1(b) on the various structural and institutional changes that the country has had to make. It can be seen that Romania avoided the larger 30–40% declines in GDP seen *on average* in transition countries, and has done *relatively* well in making many of the transitional adjustments required in these countries.

Box 3.1 Romania: Transition from 1989



(a)



(b)

Source: EBRD, www.ebrd.com, country pages for Romania

After about 1998, and encouraged by the prospect of EU accession, there were large inflows of FDI and foreign capital into the Romanian economy. As a result, the country enjoyed eight years of strong economic growth until the global recession hit in 2008. In fact, in the five years leading up to the global credit crisis GDP growth averaged over 6.5% per year. Even in comparison with other buoyant economies in southern and south-eastern Europe, real GDP in Romania has been a full percentage point higher than the average.²⁵

As a consequence, Romania has achieved impressive improvements in socio-economic indicators over this period and, between 1995 and 2005, GDP grew by nearly 50% to \$9,060 per capita.²⁶ *However, there are certain pockets of extreme poverty in the country, including in the project area where the benefits of this growth have not been realised.*

The macroeconomic instability that we are now seeing has been a feature of Romanian economic performance since the 1970s. Box 3.2 provides the longer-run historical evidence of this fact.²⁷

Based on recent statements by the government and IMF, the country has officially entered a new period of negative growth. Previous statements in early 2009 by the IMF predicted real GDP in 2009 to fall by 4.1%. However, it now seems that even these dire projections were optimistic. Current expectations are that GDP will now contract by 8% during 2009.²⁸ The implication is that the related expectation that GDP growth would be flat in 2010 and that the recovery would quickly follow now needs radical revision – even a significant ‘rebound’ of GDP by 2014 now looks much less likely. The implication for the RMP is that the early construction and operating stages of the project will now most probably coincide with a prolonged period of significantly negative GDP growth. *This will render the potential contributions of the project to the country even more significant than was earlier thought.*

25 Real GDP growth in Romania has, in comparison with ‘emerging Europe’ during this same period, been on average 2.5% points higher, averaging 6.65% during 2007–08. See IMF, *World Economic Outlook*, April 2009, table 2.4, p. 78.

26 UNDP Human Development Report 2007/2008, Country Fact Sheets – Romania.

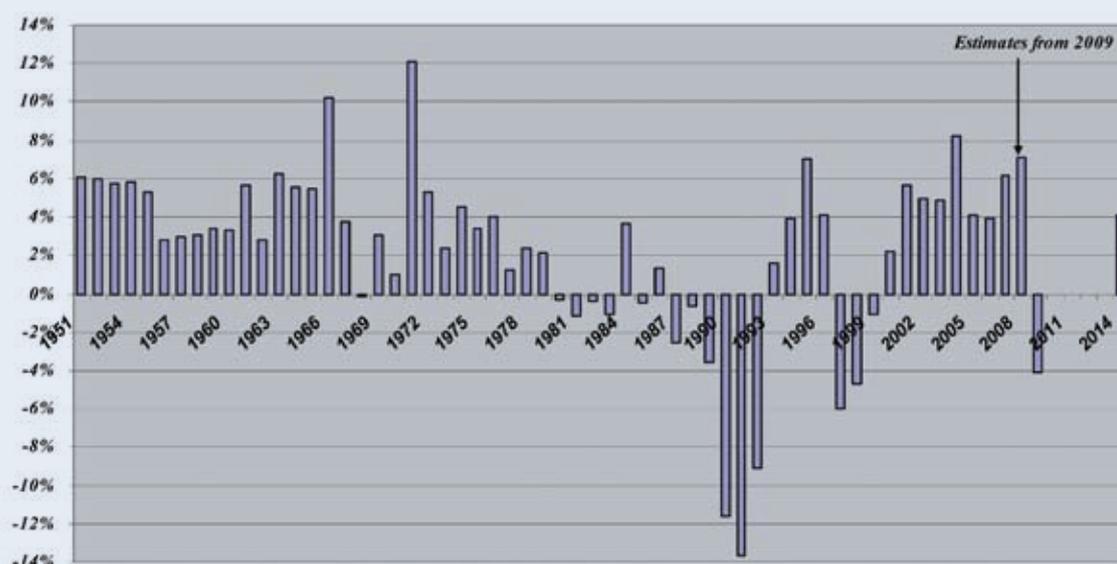
27 GDP growth rates per capita for 1951–2006 from the website of the Economic Growth and Development Centre of the University of Groningen; the Real GDP figures for 2007–14 were taken from the IMF *World Economic Outlook*, April 2009, table A4, p. 194.

28 Romania’s finance minister, Gheorghe Pogea, said on Thursday 30 July that GDP may fall 8% this year and that the forecast of a 4.1% contraction set in the agreement with the IMF would be revised.

Box 3.2 The historical record of GDP growth

Figure 3.1 shows the considerable swings of fortune that have occurred since 1950, and especially since the mid-1970s. The most pronounced period of economic turmoil was triggered by the global financial crisis of 1987. Following the economic downturn that ensued from 1987 to 1993, in just one year GDP growth contracted by nearly 14% (1991): the economy recovered but then encountered another brief downturn during the Asian/Russian financial crisis in 1997. Since then, it has remained on a broadly positive growth path until the present crisis hit in 2008.

Figure 3.1 Growth rates of GDP, 1951–2014



Source: Economic Growth and Development Centre, University of Groningen for the historical numbers; and IMF, *World Economic Outlook 2009*, for the forward-looking numbers.

Looking back at the previous episode of economic instability, the large swings in GDP growth rates do not, by themselves, adequately reflect the extent of how debilitating the economic difficulties were for Romania, especially after the demise of the USSR in the late 1980s. As a transition economy moving quickly towards a market-based system linked to an expanding EU, massive reforms were called for. The numerous structural changes, as summarised in Box 3.1, included the shake-up of a large number of state enterprises and mining operations that employed hundreds of thousands of men and women. These events resulted in significant structural unemployment, both in urban and rural areas. The rural areas were particularly hard hit, as many regions had been heavily dependent on large mines and few other employment opportunities existed. In a severely constrained fiscal environment during the late 1980s and 1990s, the government had limited ability for counter-cyclical budgetary expansion. The result was that it had no way of being able to spend its way out of the downturn and/or ease some of the socio-economic impacts associated with the reforms. However, the benefits of the reforms started to be seen in 2000 and in conjunction with a number of positive external factors, most notably the expansion of the EU and significantly increased access to global credit markets, it led to the prolonged economic boom that lasted until recently.

Certain other features of the current economic situation are also relevant. First, until the recent crisis began, the combination of large injections of FDI and new foreign capital to finance export-led growth to the EU had led to unsustainably high levels of consumption and investment growth: domestic demand, in total,

grew at a fast rate. The result was that despite growing exports to the EU, imports grew at an even faster rate, and Romania's current external account deficit exploded to the equivalent of 13.9% of GDP by 2007.²⁹ Second, in this overheating economy fed by rapid capital inflows and high expectations of economic convergence under EU membership, the authorities experienced a significant weakening of their control over monetary policy. This, in turn, resulted in higher inflation and a real exchange rate that appreciated by around 50% in the three years to mid-2007. The precariousness of this situation was made evident by the even quicker depreciation of the nominal exchange rate (by over 20%) immediately following the credit crisis that hit in late 2008. Third, during the economic boom the authorities chose to adopt a strongly *pro-cyclical* stance for fiscal policy (as was also the experience during the financial difficulties in the late 1980s and 1990s). The result was that the government deficit deteriorated from a modest 1% of GDP in 2005 to a projected 6.6% in 2009. Budgets became inflated, largely due to excessive spending growth on wages and pensions. Now that the crisis has hit, this situation has been made even worse.

Going forward, in the initial years of developing the proposed RMP, the macroeconomic situation of the country seems likely to be influenced strongly by the fall-out from the global economic crisis. Both consumers and investors borrowed too heavily during the boom, and over half of domestic private credit is now denominated in foreign currency terms. Also, most is not hedged against further depreciation of the currency. This creates significant foreign exchange risks for the borrowers and, moreover, for the foreign-owned local banks.³⁰ Because the foreign bank presence in Romania represents more than 80% of the total banking sector, locally-based subsidiaries have had to work hard to ensure that their funding commitments are maintained. This has largely been achieved and the commitment to Romania by foreign owned banks has been positive, so far. In conjunction with the crisis-related assistance received from the IMF in March 2009 for a \$17.1 billion financial support package, these two factors have so far provided 'an incredibly stabilising factor' in the region.³¹ Nevertheless, the 'fiscal space' available to the government to ease fiscal policy and cushion the pain of the downturn remains highly constrained. The government is faced with a situation where it is unlikely to be able to finance a large budget deficit and has reacted to the situation in 2009 by tightening spending.

Due to the domestic and global downturn, the expectations of the government as summarised by the IMF in its latest 2009 assessments are that:³²

- *inflation is expected to fall from 6.7% to 3.5% in 2009*: the significant upward pressures on inflation arising because of a depreciating exchange rate are expected to be kept in check by falling energy prices and other consumables;
- *the current account deficit is expected to recover from the equivalent of 12.6% of GDP in 2008 to 7.5% in 2009 and 6.5% in 2010 as falling domestic demand and depreciation curb imports*. In time, demand from the EU for Romanian exports and workers remittances will also recover; and
- *the capital and financial account of the balance of payments is expected to deteriorate* from a surplus of €18.8 billion in 2008 to a deficit of €2.7 billion in 2009 as FDI declines and capital flows out of – rather than into – the country.

In this context of falling FDI inflows and large current account deficits, the expected macroeconomic benefits that are likely to arise from the RMP seem likely to be of even greater significance than was the case when the project was conceived.

29 IMF, *World Economic Outlook*, April 2009, p. 78.

30 IMF *Country Report* No. 09/183, June 2009, p. 4.

31 *The Economist*, 13–19 June 2009, p. 79. A letter by the Minister of Finance to the IMF dated 24 April 2009 stated: 'We request that the Fund support our program through a Stand-By Arrangement (SBA) for a period of 24 months in the amount equivalent to SDR11.443 billion (€12.95 billion). In conjunction with support of €5 billion under the EU's balance of payment financing facility and other multilateral commitments of some €2 billion, this arrangement will signal the international community's support for our policies.'

32 *World Economic Outlook*, April 2009, p. 78 and data from IMF *Country Report* No. 09/183, June 2009, p. 8.

3.2 The quality of governance

In the past few years, comparative research has found that resource-rich countries that have done relatively well from their resource wealth have also been characterised by relatively good quality governance and institutions. Country case studies have also pointed to governance and institutions as key factors that have conditioned the magnitudes of the positive and negative impacts that an extractive industry project can have on a country.³³

Private investing companies such as RMGC have a vested interest in good governance because its absence can severely delay projects and reduce their levels of profitability; for example, by delaying approvals, imposing hidden costs in the form of bribes or other unproductive charges; by requiring lengthy processes of litigation on matters in dispute; and by subjecting profits to unjustifiably high levels of taxation. In a very real sense, *poor quality governance hits the bottom line!*

However, good governance is also a highly pertinent determinant of whether or not a mining country can extract the full *social and economic benefits* from an investment project such as that at Roșia Montană. Failures of governance at all sorts of levels can truly short-circuit what might otherwise be large indirect and other multiplier benefits. The component issues involved include, for example, whether fiscal revenue is used effectively or ineffectively and, therefore, whether this revenue has a larger or smaller (or even negative) impact on improving social and economic indicators.

More generally, strong institutions of government lie at the core of the task of realising the potentially positive contributions that the mining sector can make to broad-based development and poverty reduction. They do so by setting the framework that conditions how public sector entities, citizens, NGOs, private sector companies and various international players (such as donors) relate to each other. *This means that the contribution a large project such as Roșia Montană can have on broad-based development and poverty reduction could turn out to be sub-optimal. This could happen if the government institutions found at various levels prove to be unable to nurture positive interactions between these various groups.* Weak institutions also play a direct role in inflating the political risks to the financial returns that the project is expected to deliver.

It is an important proposition from this present report that the government and other stakeholders in Romania have the opportunity to achieve much higher *indirect* benefits from the RMP if they recognise the critical complementary role that appropriate policies and institutions can play in enhancing the *direct* effects.

Doing Business in Romania

In the immediate context of this present assessment, and notwithstanding the general improvements in governance indicated, it is useful to note, first, that Romania remains a relatively difficult country in which to do business. The most recent IDC/World Bank indicators on '*Doing Business 2009*' ranks Romania 47 out of the 181 countries that were assessed. This ranking is derived as the average from a listing of 10 component indicators (listed in Box 3.3). These provide a number of warning notes about the delays and other difficulties that the project might expect to encounter, even if it has not already done so. Above all, we can see that Romania ranks poorly on dealing with construction permits, registering property, employing workers, paying taxes and closing a business.

Full details about the nature of the difficulties under each of the *Doing Business* headings can be found in the World Bank Report. But, for the purposes of illustration, we can offer examples of the issues associated with acquiring construction permits and registering property. It currently requires 17 procedures, takes an average of 243 days, and costs the equivalent of 91.21% of GNI per capita to build a warehouse in Romania. Similarly, it requires eight procedures, takes 83 days, and costs 2.37% of property value to register the property in Romania. These are higher numbers than are seen in much of Eastern Europe and Central Asia, and are significantly higher than in most Western and advanced Asian economies.

³³ Previous OPM case studies for the ICMM have illustrated this point by reference to the experiences of Chile, Ghana and Peru in particular.

Box 3.3 Doing Business: Romanian rankings, 2009

Rank	Doing Business 2009
Ease of Doing Business	47
Starting a Business	26
Dealing with Construction Permits	88
Employing Workers	143
Registering Property	114
Getting Credit	12
Protecting Investors	38
Paying Taxes	146
Trading Across Borders	40
Enforcing Contracts	31
Closing a Business	85

Source: World Bank, *Doing Business 2009*. Note: rankings out of 181 countries.

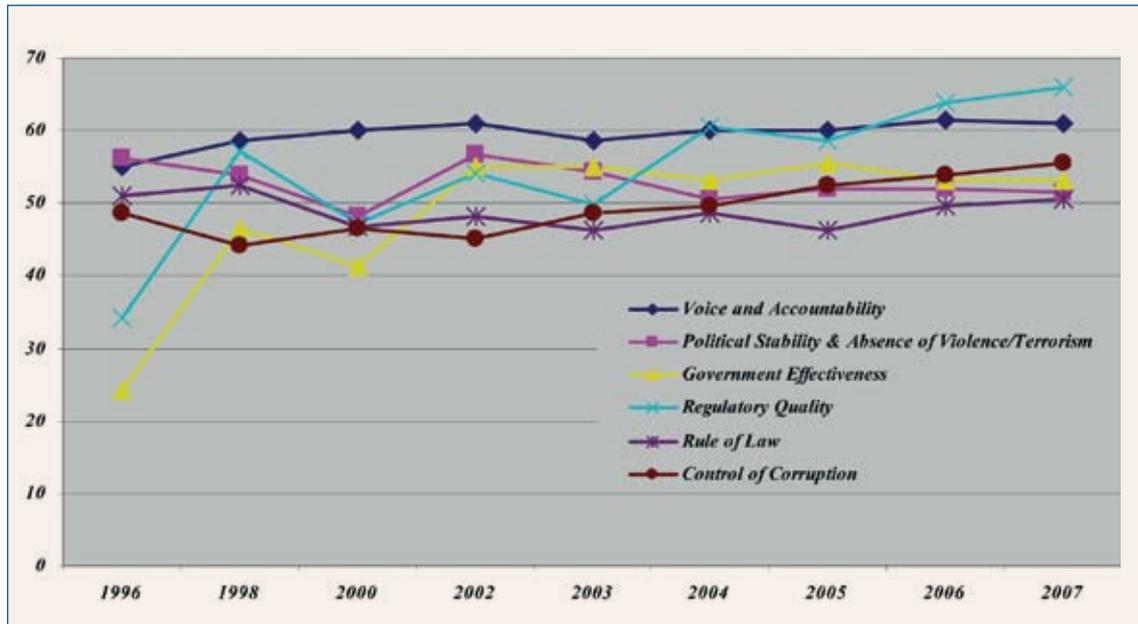
However, the news is not wholly bad, and Romania certainly seems to have been on an improving trend in the past decade or more. Indeed, one possible explanation for the enhanced economic performance of Romania since the mid-1990s relates to the improvements made to the quality of governance that has been experienced in that period.³⁴ We can assess this proposition with the assistance of indicators from the World Bank that have been available for Romania and most other countries since 1996. These indicators provide an aggregate overview of six dimensions of the quality of governance in Romania and elsewhere:

- Voice and Accountability;
- Political Stability including Absence of Violence/Terrorism
- Government Effectiveness;
- Regulatory Quality;
- Rule of Law; and
- Control of Corruption.

The evidence would indicate that the administrative and socio-political capacities of the Romanian government have been strengthened considerably since the mid-1990s (see Figure 3.2). The two greatest improvements have been in the areas of Government Effectiveness and Regulatory Quality, where the indicators have almost doubled during the period in question.³⁵ Further gains are likely as a consequence of the new structural measures to which the government has committed as part of its new April 2009 programme with the IMF (e.g. improved regulation of the banking sector).

34 Worldwide Governance Indicators (WGIs) research project of the World Bank, covering 212 countries and territories, and measuring six dimensions of governance between 1996 and 2007. The latest aggregate indicators are based on hundreds of specific and disaggregated individual variables measuring various dimensions of governance, taken from 35 data sources provided by 32 different organizations. The data reflect the views on governance of public sector, private sector and NGO experts, as well as thousands of citizen and firm survey respondents worldwide.

35 In comparison with other Central and Eastern Europe (CEE) countries, on the one indicator 'Rule of Law', Romania sits on a par with Bulgaria and neatly between Hungary and Moldova/Ukraine.

Figure 3.2 World Bank governance indicators: Romania, 1996–2007

Source: Worldwide Governance Indicators (WGI) research project, country's percentile rank (0–100) amongst all countries in the world.

Note: 0 corresponds to lowest rank; 100 corresponds to highest rank. This figure shows the percentile rank of Romania on each governance indicator. Percentile rank indicates the percentage of countries worldwide that rate below the selected country. Higher values indicate better governance ratings.

Further improvements that could enhance the direct impact of the RMP are possible, and some ideas about what these might include are addressed in the Toolkit developed by OPM for the ICMM, which brings governance into much sharper focus than is normal in traditional impact assessments of mines.³⁶ Some of the proposals outlined by the company, such as working with NGOs in the community to oversee the monitoring and evaluation of key aspects of the project, would be entirely consistent with the methods outlined in the Toolkit to strengthen and improve governance.

Companies such as RMGC will recognise that, at best, they can exert only an indirect influence on improvements in the governance and institutions of their host countries. Furthermore, 'improved governance' is not only about technocratic solutions to administrative problems, but also about managing fundamental socio-economic and political transformations. Nonetheless, in their interactions with government it is helpful for the companies to understand how their own activities may impact short- and long-term government objectives.

In the immediate context of the RMP, we argue there is great potential for local, regional and national governments to formulate their own plans and programmes in ways that could potentially enhance the direct spend of the RMP itself, and so lead to a much larger socio-economic return than might otherwise be possible.

3.3 The role of mining in Romania

As noted, Romania has had a long history of mining a wide range of metals and minerals including gold, silver, combined metals and copper; as well as salt, uranium, lignite and coal. Mining activities are dispersed over six of the eight regions of Romania; however, it is the west and north-west of the country that has a particularly high concentration of mines. In the late 1980s, there were an estimated 350,000 people

³⁶ ICMM, Resource Endowment initiative Toolkit, *The Challenge of Mineral Wealth*, London, April 2006.

working directly in the mining industry, being paid twice the average wage; a further estimated 700,000 people working indirectly within the industry.³⁷ As a whole, the mining sector was providing jobs for 10% of the population³⁸ and, as was typically found with other centralised economies, the responsibilities of the large state-owned enterprises that then managed the business also extended to providing key public infrastructure and social services.

Strategically, the focus of mining in Romania at this time was largely on the coal sector, with the explicit policy aim to achieve energy self-sufficiency. By 1989, when output reached its peak, there were 278 mines in operation.³⁹ About 90% of all mining activities in Romania at this time were carried out by six state-owned National Mining Companies. In addition to the mine operators, there were state owned service industries providing technical and research support to the mines.⁴⁰

However, the budgetary cost of keeping hundreds of largely uneconomic (and environmentally damaging) mines operationally productive was increasingly recognised to be unsustainable. By 1996, for example, the government support to the mining industry for production subsidies totalled around \$385 million.⁴¹ Therefore, by the late 1990s it was clear that Romania that could no longer afford to subsidise uneconomic, polluting mines. Major restructuring initiatives began in 1997.

The first task of the government was to close 520 of the 650 mines that were still operating in 1997. In this process, the number of mining employees nationwide was halved. Most miners were left with severance payments of 12–20 months' salary; however, few other activities were initiated to provide alternative employment or mitigate social hardships in the mining regions. *These areas now have extremely high levels of unemployment and, in the case of Roșia Montană, an estimated 17.2% of the population lives on less than \$2 per day. This figure could potentially increase, as the financial aid paid to retrenched miners is expected to end in 2009.*⁴² The other knock-on effects of mine closure – beyond the loss of direct, indirect and induced jobs – was a significant decline in the quality and quantity of both the infrastructure and the social services that had previously been provided by the state-owned enterprises. By 2004, the focus of the government was on European Union accession, and it agreed with the EU to end all subsidies to the mining sector by the end of the decade.⁴³ This, of course, was expected to have at least a short-term and further negative effect on the hardships in economic and social terms that the large-scale mining closures had already caused.

The more recent economic history of mining in Romania has been much more stable, and net investment in the mining sector from 2000 to 2006 remained constant at around 10% of total investment in 'industry' (this is in comparison with 65% of net investment in manufacturing and around 25% in electric and thermal energy, gas and water – see Figure 3.3). Placed in the context of the earlier Communist period the transformation of the productive structure is dramatic, with large falls in the contribution that mining made to the Romanian economy. In 1990, for example, mining comprised 27% of net investment in the industry sector of Romania (three times more than today). At this time, the same was seen in the electrical and thermal energy, gas and water energy sectors. Manufacturing then represented only about 45% of the total as compared with the much higher percentage achieved in 2006 of around 65% (see Figure 3.3).⁴⁴

37 Poverty and Social Impact Analysis of Mining Sector Reform in Romania: A Policy Note, World Bank Report Number 32772-RO, June 2006, p. 2.

38 World Bank Report No: 19347-RO – Project Appraisal Document on a Proposed Loan in the amount of \$44.5 Million Equivalent to the Government of Romania for a Mine Closure and Social Mitigation Project, August 6, 1999.

39 World Bank Report No: 19347-RO.

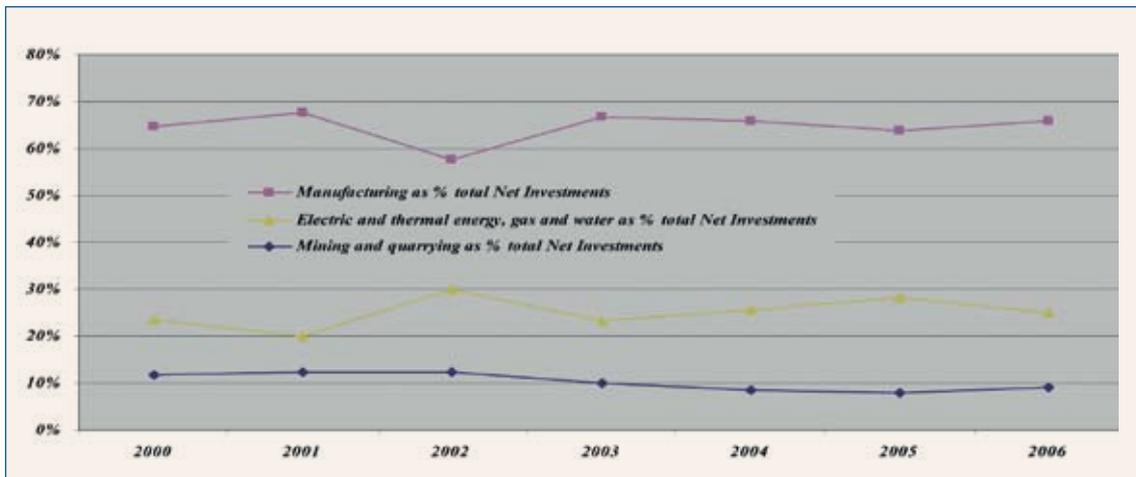
40 By the late 1990s, the production of major minerals in Romania in terms of metal content of different products was about 1.8 tonnes of gold, 20,300 tonnes of copper, 18,000 tonnes of lead, 30,500 tonnes of zinc, 238,800 tonnes of iron ore, 24.2 tonnes of molybdenum, 23.2 million tonnes of lignite, 341 million tonnes of brown coal, and 4.6 million tonnes of hard coal. Copper, lead, and zinc were produced in concentrate form – World Bank Report No: 19347-RO.

41 Ibid.

42 Data provided by RMGC and calculated based on Roșia Montană Town Hall data.

43 Romania joined the European Union on 1 January 2007.

44 *Romanian Statistical Yearbook*, ch. 12, table 12.6.

Figure 3.3 Net investments within Romania's industry sector, by activity

Data source: Romanian Statistical Yearbook, ch. 12, Net investments by activity of industry at level of Cane Division

Within the mining sector in Romania the pattern has remained largely stable over the past decade, with hydrocarbons comprising 80% of net investment since 2000, minerals and metals such as gold at around 12%, and coal now only slightly less at 10%. The major changes that occurred between 1990 and 2009 were the massive reductions in coal mining and preparation (from 36% to 9%), and the large increases in hydrocarbons (from 50% to 80%).

3.4 Poverty and the social situation in Romania

Further work on the poverty and broader social impacts of the RMP is highly desirable, so as to provide a more comprehensive assessment of the local microeconomic and social impacts of the project. In essence, it will need to combine three main elements:

- A baseline assessment of the pre-existing economic and social condition of the households in all the mine-affected areas;
- An appreciation of the specific activities and any special programmes proposed by RMGC that will be likely to have an impact on that baseline situation (e.g. any employment, health, and education projects); and
- An analysis of the likely quantitative and qualitative effects of the RMGC activities and programmes in relation to the baseline.

As was noted in the Introduction, this present report has a macroeconomic focus. However, we have included an initial summary of the key dimensions of the poverty and social situation in the mining-affected areas. This has been prepared by referring briefly to some of the EIA materials produced by the company itself, and also to the broader Romanian context as it has emerged and been documented in the relatively recent past.⁴⁵ The purpose is to place the Roșia Montană assessment into a broader national context, and also to draw attention to certain key sub-issues that will help to design the eventual optimisation of the local impacts.

The impact of Romania's post-Communist industrial decline in general, and mine closures in particular starting in the 1990s, have undoubtedly had a significant national impact upon household welfare, most notably through the loss of employment, access to basic social services and government transfers.

⁴⁵ The EIA was filed in 2006 before the process was halted by the Government of Romania in 2007. Extensive reports based on this work are available on the project website and have been reviewed in preparing this present report.

Regions of the country that previously had a high concentration of active mines experienced a significant deterioration in basic services, such as electricity and water, and also health and education: many qualified teachers and medical staff left towns after mines closed.⁴⁶ A Poverty and Social Impact Assessment undertaken in 2006 considered the welfare effects of mine closure on different stakeholders by analysing four rounds of household survey data.⁴⁷ The findings show that, while laid-off miners experienced the largest probability of a welfare decline, their higher incomes and severance payments meant they certainly were not the hardest hit. In fact, it was the livelihoods of the workers indirectly servicing the mines (indirect and induced labour) that were more harshly affected by mine closure, because these workers rarely received any compensation. Currently, it is estimated that 17.2% of the Roșia Montană population lives on less than \$2 per day, and this figure could increase as the financial aid paid to retrenched miners is expected to end in 2009.⁴⁸

The effects of restructuring within the mining sector have also been shown to have a significant gender bias. Most notably, the data show that while women comprised 16% of the workforce in 1997, by 2006 they comprised only 7%. Furthermore, once having lost their jobs, women's re-employment chances were 16% lower than men's in the mining regions – this is despite the national unemployment rate for women being lower than for men.⁴⁹ Anecdotally, women also suffer disproportionately from secondary impacts of mine closure, as rates of domestic violence and divorce increase, and the burden of child care increasingly falls on women as household incomes fall and pre-school facilities are no longer affordable.

Much fuller detail on these and other features of the socio-economic situation at the national, the regional and the local community levels are presented in Annex A to this report. However, in relation to the narrow community level of Roșia Montană itself, we can note that the number of people in employment is extremely low. Furthermore, if those employed by RMGC were excluded from the employment figures, the numbers would be considerably lower as, even prior to starting construction, RMGC provides a large amount of employment in the area. Those officially registered as unemployed in Roșia Montană were estimated at 14% of the active population, and these people receive financial aid of around \$3.3 per day. However, this includes those miners laid off at the time of the mine closures in 2006 and whose financial aid will probably be exhausted in 2009.

In addition to the officially unemployed, out of the total of 1,500 people comprising the active population a further 67% of them were unemployed but not officially registered as receiving financial aid.⁵⁰ As noted, from 2009 the financial aid currently being paid to ex-miners is expected to come to an end, and it is possible a further 209 people will be added to the 1,004 people who are unemployed but not receiving financial aid. RMGC has collected official employment and unemployment data, and has compared this with internal human resources information, finding that, of the 1,004 people who are unemployed but unregistered, around 700 of them have submitted an application for employment with the company.

Salaries of those employed by RMGC will be higher, on average, than other jobs available in the area; indicative figures from the company show that average gross monthly salaries for Romanian workers employed by RMGC will be around \$1,233, with the largest group of workers (230 staff) paid \$836 per month. Of those people in employment, income levels in Alba County are relatively low and, in 2008, gross monthly incomes were estimated for those engaged in agricultural activities to be around \$543 per month, those working in industry and construction at \$522, and those in services at \$592. The poverty figures are worse in Roșia Montană, where an estimated 17.2% of the population have incomes under \$2 per day. The stark figures highlighting the levels of poverty in Roșia Montană are indicated by the number of households (55%) receiving financial aid for heating, as they earn less than \$6.42 per day. How this proportion compares with other communities is not currently known (see Annex A for further information on Poverty and Human Development at the national, regional and local levels).

46 Poverty and Social Impact Analysis of Mining Sector Reform in Romania: A Policy Note, Report Number 32772-RO, June 2006, p. 3.

47 Ibid.

48 Data provided by RMGC and calculated based on Roșia Montană City Hall data.

49 Ibid.

50 Data provided by RMGC by email on 23 June 2009 in a document entitled 'Gabriel – poverty data 2'.

4 The macroeconomic impacts of the Project

This section of the assessment is the core of the report. It analyses the wide range of macroeconomic effects that are likely to arise as a result of the project. For the most part, these impacts are both positive and large. However, the significant magnitudes (in both absolute and relative terms) of some of the components will create some challenges for the local, regional and national government. We begin with a brief listing of the main probable impacts of the project, and then examine the more important of the macroeconomic issues in greater detail.

The numerical estimates shown here and elsewhere in the report have been based mainly on the data received from the RMGC team on 11 May 2009 and on subsequent detailed elaborations provided during September 2009.

4.1 Overview

This section provides a brief summary of the main elements of the project's macro-economic impact. The sections that follow then probe the various component areas in greater detail.

Foreign direct investment (FDI). Over the life of the project, over \$2 billion is expected to be added to the stock of FDI by the RMP. The vast majority of the FDI comes in the early years of the project, a critical time for Romania. The FDI includes past expenditures by RMGC in-country in developing the project, estimated at around \$275 million. Furthermore, during the two years of the construction phase of the project (Years -2 and -1),⁵¹ there will be large inflows into Romania totalling \$1,300 million of debt financing – part third-party loans and part shareholder loans. In addition to capital equipment, these sums also include capitalised interest and financing costs, as well as provision for contingencies should any cost overruns occur during construction and for working capital during the initial years of the project.⁵² Therefore, the total cost to completion is expected to be \$1,600 million.

Thereafter, during the operational period there will be additional investments to further develop, maintain and then close the mine, amounting to some \$503.3 million (the main mining work lasts for 16 years on some, at least, of the four pits, followed by 5 years of expenditures that largely focus on mine closure).⁵³ To put this in context, the data show that total FDI flows into Romania in 2007 were \$9.7 billion and FDI stocks were \$60.9 billion.⁵⁴ By 2008, FDI flows had increased to \$13.4 billion. Therefore, the investment in Roșia Montană merely to complete construction would be the equivalent of around 12% of 2008 total FDI flows. Of the total FDI stocks in Romania in 2007, the value of the investments in the mining sector totalled \$2.9 billion, or 4.8% of the total. The extra FDI at Roșia Montană up to the end of the construction phase would be the equivalent of around 55% of this existing stock of FDI in the mining sector in 2007. The current downturn in Romania's economic fortunes clearly increases the relative significance of the Roșia Montană investment. It was estimated by the IMF in June 2009 that FDI for 2009 would be at €3.5, around \$5.1 billion.

The exchange rate. Since the late 1990s, the enthusiasm for investing in emerging economies close to markets in Europe has created its own strong momentum. However, in Romania, as elsewhere, this momentum has created its own significant challenges; nearly half of the foreign investment coming into the country in recent years has been in the form of 'hot-money flows' and not substantive FDI. One recent

51 It is probable, but not yet certain, that Year -2 (the start date for construction) of the project could be 2011.

52 These costs of \$380 million are expected to be divided along the 60:40 debt to equity split.

53 This figure comprises \$366.3 million in total 'sustaining capital' and \$137 million in 'closure costs'.

54 UNCTAD, *World Investment Report 2008*; www.unctad.org/wir

effect of the large capital inflows into the region has been greater financial and monetary instability which, in the fallout from the global credit crunch, has put significant downward pressure on the nominal exchange rate. This adverse effect could have been significantly reduced if more of the capital flows into the country had comprised investment in 'tangible and intangible assets' (FDI) that would have added to the country's productive potential and not been as quick to flee the country. In this context, and as noted by the National Bank of Romania, investments in tangible assets, such as mines, provide a 'substantial contribution to economic growth ... (and confer upon FDI) ... a stable, persistent character ... thus inducing a significant degree of foreign investment durability'.⁵⁵ Roșia Montană, as a large mining investment, will bring new investment that is both stable and durable. Through the long-term export of mineral products, the project will contribute to helping reduce the country's large current account deficit and bring greater stability to its exchange rate.

This last point is examined in Section 4.8 (Will the real exchange rate appreciate?); however, the situation, in brief, is that the large export surplus generated by the project is unlikely to impact on the country's real exchange rate given the depth, maturity and openness of the economy.

Exports and imports. A large amount of the expenditure during the construction phase of the project will be on imported equipment and some foreign labour. This will result in an initial surge of imports and other Forex outgoings totalling around \$378.2 million during these first two years.⁵⁶ However, immediately following construction, or in Year 1 of the project, the anticipated export revenues quickly rise to around \$547.8 million per annum in real terms, averaging out at \$467.5 million over the 16-year project life, and peaking at \$666.9 million in Year 3. This peak year would imply a 1.3% increase in Romania's export of goods relative to a 2008 base year.⁵⁷

Set against high levels of largely constant annual export earnings will be the need for ongoing imported goods and services to support a capital intensive mining process. Specifically, there will be a need to import goods and services averaging some \$75 million per annum during the project's 16-year life. This will still leave a considerable export surplus, which will represent a substantial contribution to improving the country's overall external trade balance – by around \$393 million per annum during the life of the project. This, in turn, will help to ease Romania's current account deficit, swollen in recent years as imports have significantly outstripped exports. Because dividends do not start to be paid until Year 6, the average net contribution to the current account balance over the first five years of the operational period is around \$479 million per annum. Even after accounting for debt servicing and dividends paid abroad, the average net contribution to the current account balance over the 16-year operational life of the project will be around \$300 million per annum.

Capital investment. The estimated level of gross fixed capital formation in Romania in 2006 was \$36 billion or (25.6% of GDP).⁵⁸ Therefore, the substantial initial capital investment of \$1,600 million up to and including the construction phase represents a significant boost to total national capital formation.⁵⁹

Government revenue. The anticipated total revenue stream going to the government from the Roșia Montană project is expected to be \$1.72 billion during the life of the mine (based on a constant 2008 dollar basis). This will comprise a range of taxes paid at the state, regional and local levels, as well as dividends paid on the government's equity in the project. Averaging out the total revenue contribution over the two-year construction period and 16-year operational life, the revenues paid to the government average \$95 million per annum for 18 years. Taken over the first 10 years of operational life, taxes and dividends

55 National Bank of Romania and National Institute of Statistics publication, *FDI in Romania as of 31 December 2007*. <http://arisinvest.ro/files/whyromania/FDI%202008.pdf>

56 It is anticipated that \$68,594,300 will be spent on goods and services from within the EU and \$120,508,931 from outside the EU during each of the construction years. Once again, it is to be noted that, even in the early year import surge, the capital account impact of FDI more than offsets the current account impact and produces an overall positive net impact.

57 Projected figures of 'Exports of Goods' for 2008 were \$49.9 billion, based on data from the IMF *Country Report* No. 08/208, published July 2008, table 3, p. 32.

58 *Romanian Statistical Yearbook*, National Accounts, ch. 11, table 11.3.

59 In National Accounts terms, almost all of the funds brought from abroad will go into fixed capital formation with the exception of a small proportion for intermediate consumption.

average \$103 million per annum. The total annual revenue paid to the government is expected to peak at \$166 million in Year 11, because of \$112 million paid in taxes and a large dividend payment of \$54 million to a government-owned entity. These project-related payments can be compared with the government's *total revenues* in 2008 of around \$66 billion.⁶⁰ The peak of \$166 million paid in taxes and dividends in Year 11 would provide the equivalent of nearly 0.25% of *all revenues* in that year. The division of taxes between the state, regional and local levels, as well as the net present value of the revenue streams, will also be looked at later in this report.

Gross domestic product and gross domestic product growth. Due to the well-established mining sector and wider industrial linkages that exist in Romania, there are numerous potential economic linkages that will result in many of the goods and services required by the mine being sourced within Romania: a significant proportion of Romanian goods and services will be employed in the project. During the construction period, an average of \$194 million will be spent per annum and, starting from Year 1 of operations, the Romanian spend will average \$96 million per annum. The value-added element of this spending will contribute to GDP in the form of local wages and profits for the suppliers of goods and services to the project.⁶¹

A second major *direct* GDP contribution involves the *profit or income* that is generated by the mine, calculated before the deduction of interest payments, dividends or tax payments to government. A third direct GDP contribution will come from the significant proportion of labour, manual and non-manual, employed during the 18-year project life. The total direct wage cost of expatriates and Romanian workers will average some \$63 million per annum during the construction period, which then falls to \$23 million during the operational period. As the financing for the project has been assumed to come from foreign sources, a large part of the interest and dividend payments from the project will be made overseas and so will not contribute to Romania's GNI.⁶² Similarly, the payments to expatriates of \$8 million per annum during the construction period and \$1 million per annum during operations are also removed from GNI. Nevertheless, they will be an addition to GDP, as conventionally defined. Taken in totality, the project will certainly make a positive and significant contribution to increasing GDP and GNI in a number of key areas. The multiplier effects of the project spending on Romanian labour, operational and capital costs, taxes, royalties, and community contributions will increase these sums significantly. The detailed calculations presented later in this report show estimates of both the direct and the additional multiplier effects of the project on both national output and national incomes.

External debt. Romania's external debt stock (48.5% of GDP in 2007) remains relatively moderate when compared with some of the transition country comparators.⁶³ However, the rapid pace of debt accumulation in the recent past, together with a deteriorating maturity structure (short-term debt was about 34% of total debt in 2007), suggests increased vulnerabilities. As of the end of 2007, reserves coverage was still adequate to cover all short-term external liabilities. However, subsequently, Romania has been hit by the global economic downturn. With revenues and exports both falling, and with a sharp decline in the large capital inflows that previously supported a strong currency, the country had to turn to the IMF in March 2009 for a financial support package, and was provided with a \$17.1 billion Stand-By Arrangement. To put this in context, even prior to the crisis the gross financing need for 2007 was \$4.9 billion (comprising the public sector deficit plus amortisation of public sector debt), of which half is denominated in foreign currency. Significantly, the Roșia Montană project will not add any debt to the country's burden of foreign public debt. However, by contributing additional tax and dividend revenues it will play some part in potentially reducing the need for foreign borrowing.

Domestic jobs. An estimated 2,337 jobs will be created for Romanian workers during the two-year construction period; that flattens out to 881 jobs during operations. Average gross salaries of workers

60 IMF *Country Report* No. 08/208, July 2008, table 4. Preliminary data for 2008 indicates revenues and taxes of 32.6% and 28.3% of GDP, respectively (GDP in 2008 estimated at \$202.74 billion). The exchange rates for 2008 are taken from www.oanda.com

61 The additional value-added created in supplier firms can be thought of as a 'first round indirect effect' of the project but, for the purposes of our calculations, has been included in the more overtly 'direct' effects of wages and pre-tax profits.

62 Due to the ownership structure, anticipated net dividends to be paid overseas are estimated to be 3.3 times larger than dividends paid domestically.

63 See IMF July 2008, Figures 12 and 13.

employed in the RMP will be considerably higher than the estimated \$2 per day that was the average salary paid in other mines in a study conducted in 2006.⁶⁴ Salaries of those employed by RMGC will be higher on average than other jobs available in the area, and indicative figures from the company show that average gross monthly salaries for Romanian workers employed by RMGC will be around \$1,233, with the largest group of workers (230 staff) paid \$836 per month. The multiplier analysis presented later in this report provides estimates of the likely additional *indirect* job creation.

Community contributions. From the early stages of the project, there will be significant company spending on a variety of community social and economic services. These contributions from the company will deliver up-front new infrastructure, other facilities and services to the local areas. These have been estimated on a conservative basis but, nonetheless, they yield a contribution of more than \$129.6 million in NPV terms at a 10% discount rate and \$177.9 million at a 5% discount rate. These include health and welfare, training and education, community infrastructure, institutional buildings in Piatra Alba, and patrimony (including preserving monuments, and building a museum and an underground gallery).

4.2 A closer look at gross national income, gross domestic product and gross domestic product growth

We begin the more detailed assessment of the effects summarised above by examining Romania's GDP and its GNI. This section provides a quantified assessment of the impact that the RMP is likely to have on future GDP and GNI, and also on the growth rates of these aggregates. This includes estimates of the income and output multipliers that are likely to be associated with the project.

Romania's real GDP growth in recent years has been strong and, in the three years to 2009, averaged 7%. However, due to the fall-out from the global economic crisis that started to be felt in 2008, growth is likely to be negative in 2009, with the actual growth rate expected to be somewhere between -4.1% and -8%.⁶⁵ However, irrespective of the wider economic problems now facing the country, the effects of the Roșia Montană mine are expected to be positive. The time series of *direct effects on both GDP and GNI*, expressed as a percentage of total GDP and GNI, is presented in Figure 4.1. It can be seen that the project will contribute a small but significant increase in both GDP and GNI.

The increase will come, first, from a *direct income generating effect* associated with the significant proportion of labour, manual and non-manual, employed during the 18-year project life. The total direct wage cost of Roșia Montană will average some \$63 million per annum during the construction period, subsequently levelling out to \$23 million during the operational period. The effect of the project on GNI is smaller than the effect on GDP, as expatriate salaries, however limited in amount, are conservatively assumed to be entirely repatriated abroad, estimated at \$8 million per annum during construction and \$1 million per annum during operation.

The second effect involves the profit or income that is generated by the activities of the mine calculated before the deduction of interest payments, dividends or tax payments to government. A large part of this unadjusted profit is eventually re-distributed to shareholders (in dividends), to debt-holders (in interest payments) and to government (in the form of tax payments). In the first instance, it represents a standard part of any project's contribution to GDP. Since the financing for the project will come substantially from foreign sources, a large part of the *interest and dividend payments* from the project will inevitably need to be made overseas and so will not contribute to Romania's GNI.⁶⁶ They will, however, be an addition to GDP, as conventionally defined.

64 A summary of a World Bank Report produced in 2006 estimated wages in mining companies were projected at \$2 per day, although it was noted that CNH Petrosani pays double the average wage for the mining industry at \$4 per day (Poverty and Social Impact Analysis of Mining Sector Reform in Romania: A Policy Note, Report Number 32772-RO, June 2006).

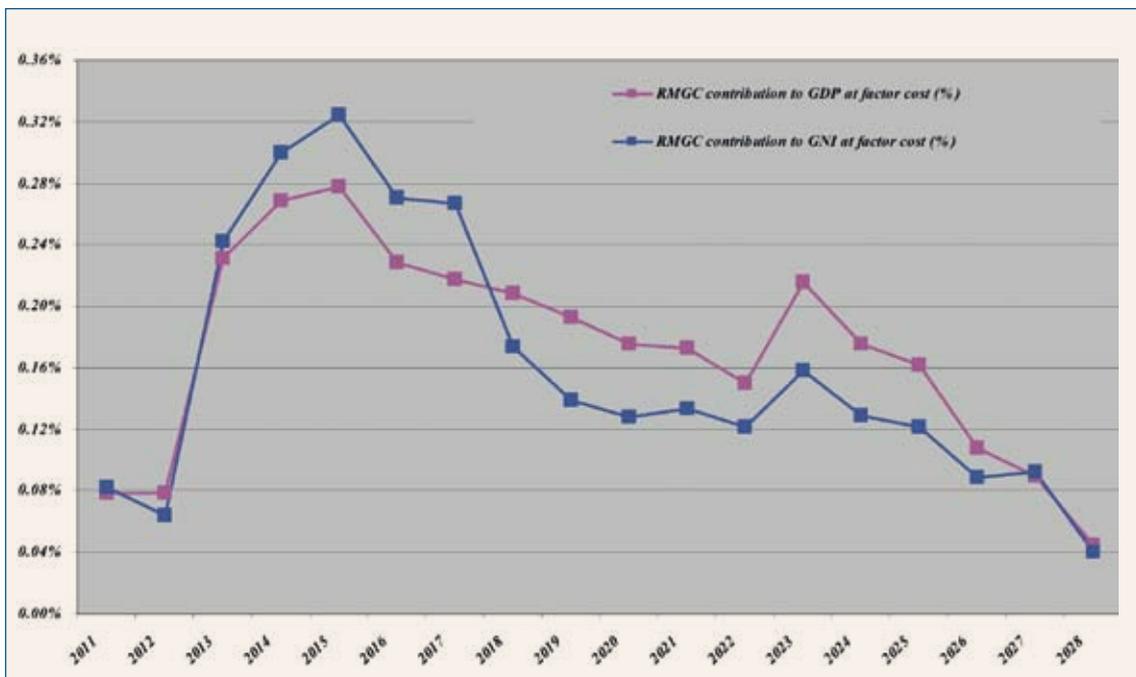
65 Romania's finance minister, Gheorghe Pogea, said on 30 July 2009 that GDP may fall to 8% in 2009, and that the forecast of a 4.1% contraction (set in the April 2009 agreement with the IMF) would be revised.

66 Due to the corporate structure, anticipated net dividends to be paid overseas are estimated to be three times larger than dividends paid domestically.

Third, in addition, it is important to take note of the significant proportion of inputs that will be sourced within Romania. An estimated \$194 million is expected to be spent within Romania on a wide range of goods and services during each of the two years of construction, and around \$96 million per annum on average for the remaining 16 years of operational life. A part of this local spending will create additional value-added (and so a further contribution to GDP) in the form of both wages and salaries, and profits in the associated supplying firms.⁶⁷

The direct effects of the project on GDP (and GNI) come from the three identified components of in-country payments as described. When these three elements are brought together, the contribution is shown in Figure 4.1 to be somewhere between 0.1% and 0.3% of total GDP.⁶⁸ The most significant direct contribution to GDP of the project is in Year 3, at 0.28%; with the average contribution during the first five years of operational life at 0.24% of GDP. Over the life of the mine an estimated total direct contribution to GDP of around 3% would be the equivalent of approximately \$6 billion.

Figure 4.1 The RMGC direct contribution to Romania’s GDP and GNI



Data source: Calculated from RMP 2009.

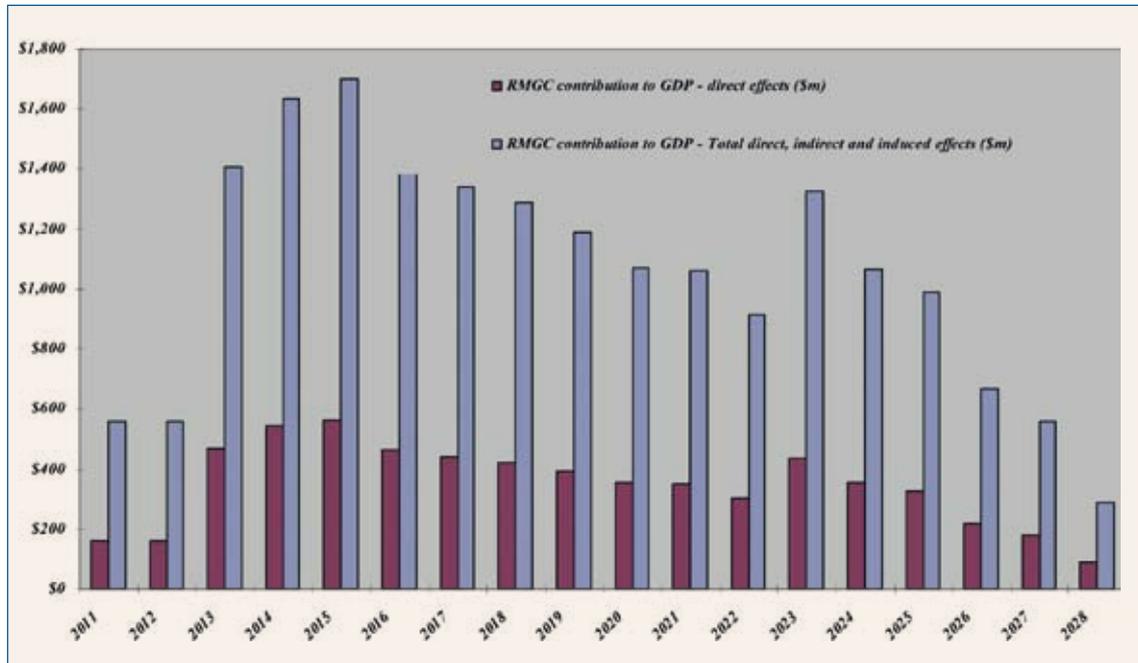
Although the direct contribution to GDP may not seem particularly large, because it is sustained over at least 18 years the cumulative effect is nonetheless significant. Furthermore, the multiplier results presented for gross output indicate that the multiplier effects of the project on GDP (and GNI) are likely to increase these sums significantly – possibly by a factor of over three times. Thus, for example, the total direct, indirect and induced contribution to GDP in Year 3 could be as high as \$1.7 billion, or 0.84% of GDP (i.e. three times greater than the direct contribution of \$564 million. See Figure 4.2). Over the 18-year project duration we

67 One possible caveat to this argument is the fact that, since the large state-run mines closed a few years ago, there is a risk that many of their supplying firms have also had to close. The consequence of this is that some of the assumed potential linkages with the wider economy could fail to materialise. However, the analysis undertaken by RMGC indicates there is still sufficient capacity in the Romanian economy to supply many of the goods and services that will be required. Furthermore, additional opportunities exist to increase GDP and GNI further, if additional investment is undertaken by the wider private sector to expand the technical and manufacturing capabilities of Romanian suppliers to this project and to those whose incomes are increased by virtue of the direct and indirect impacts on such incomes from this project.

68 The ratio of GNI to GDP (GNI being 79.8% of GDP) was taken from World Bank ‘Romania at a Glance’, 24 September 2008, the only source to include both GDP and GNI estimates. The GDP figure for 2008 (\$202.74 billion) was taken from IMF June 2009, and the same ratio applied to give a GNI estimate of \$161.8 billion. These numbers were then used as the base year and carried forward (at a constant rate) for the life of the project, to reflect the constant prices given by RMGC for the expected project spend.

have estimated GDP could be 9% higher with the project than without it. This would be the equivalent of around \$19 billion.

Figure 4.2 The RMGC direct, indirect and induced contribution to Romania’s GDP and GNI



Data source: Calculated from RMP 2009.

4.3 Input–output multiplier results for outputs and incomes

Our analysis has calculated standard input–output (I-O) multipliers for both output and incomes. This work has utilised the 2006 I-O table for Romania that provides information on 55 separate sectors of the economy. The analysis has used the 2006 coefficients of the I-O table and has *not* sought to update these to the later years (e.g. to allow for the possible shifts in technology, and so on). The approach has been to compute both the **indirect** effects that arise from the purchases of goods and services as between the various productive sectors and also the **induced** effects that arise from the spending of higher levels of household incomes. These technical details are explained briefly in Box 4.1 and then more fully in Technical Annex B.

Box 4.1 Input–output multipliers

Impact analysis and input–output multipliers

Based on detailed estimates of spending during the construction, operation and closure phases, various categories of project expenditures can be identified:

- (a) domestically-produced goods and services (albeit using imported raw materials);
- (b) wages and salaries paid to Romanian labour (national, regional and local);
- (c) other domestic expenditures (e.g. taxes, permits, and so on); and
- (d) payments abroad, mainly in the form of wages and salaries to foreign workers and direct imports of goods and services.

Spending on (a) and (b) is likely to precipitate further knock-on effects in Romania. The extra demands from (a) will lead to additional raw material requirements and, hence, the need for more output from Romanian producers: these are the *indirect* effects. Also, the extra income in (b) will be spent, at least in part, on Romanian products: these are the *induced* effects.

Features of the input–output (I-O) model

A standard I-O model captures the inter-industry multipliers and, hence, the direct and indirect impacts. The principal assumptions underlying the model are that the base year input structure reflects the inherent technical input requirements of sectors, and that there is excess capacity in domestic production and an excess supply of labour. One particularly advantageous feature is that the model can be calibrated with just a single set of base year data (i.e. the I-O table). In many I-O analyses, the inter-industry structure is augmented by household income and expenditure coefficients so as to capture the income generating and spending behaviour of households within the model. This generates so-called 'Type II' multipliers. 'Type I' multipliers capture the indirect effects but not the induced effects. Many analysts view the Type II model as providing a reasonable first approximation of the economy-wide multiplier effects: just how good an approximation this is will depend on a multitude of factors.

Some caution in interpreting the I-O multiplier results

Notwithstanding their simplicity, transparency and widespread use, I-O multipliers have significant limitations that need to be borne in mind when assessing the results. In particular:

- The existing input structure might not accurately reflect incremental inputs necessary to meet the project demands. Input technologies might change, or changes in relative prices may also lead to substitutions between inputs;
- There may be supply constraints in some domestic sectors or in the availability of certain kinds of labour. If so, then the multiplier effects obtained will be overestimates.

While Type II multipliers may be considered a first approximation, the secondary and economy-wide effects are likely to be much more extensive and complex. Attempts to establish a better approximation leads some modellers into developing much more sophisticated models (such as computable general equilibrium – or CGE – models) that embrace more behavioural responses and market behaviour. These models are not necessarily any better; they require more data, invoke many assumptions and are certainly less transparent. In some respects, the I-O model can be considered as a particular variant of a CGE model; that is, it is a 'limiting case', reflecting a particular set of macroeconomic and microeconomic closures. It is not, therefore, a substantially different kind of model.

If either of the I-O assumptions is not valid, then the Type II results may *overestimate* the economy-wide responses. On the other hand, the fact that only limited endogenous behaviour is incorporated in the I-O model means that the model is likely to *underestimate* the total impact of the project. Therefore, the net conclusion is that the I-O (Type II) model may well deliver a first approximation to the total direct, indirect and induced effects of the project.

The underlying calculations utilise the direct spending of the RMP across the 55 sectors identified in the I-O table. This direct spend is then juxtaposed mathematically with the coefficients of the I-O and household spending tables to generate the implied values for both the indirect and the induced effects, as explained in Box 4.1. This calculation has been carried out for each separate year of the mine's life cycle.

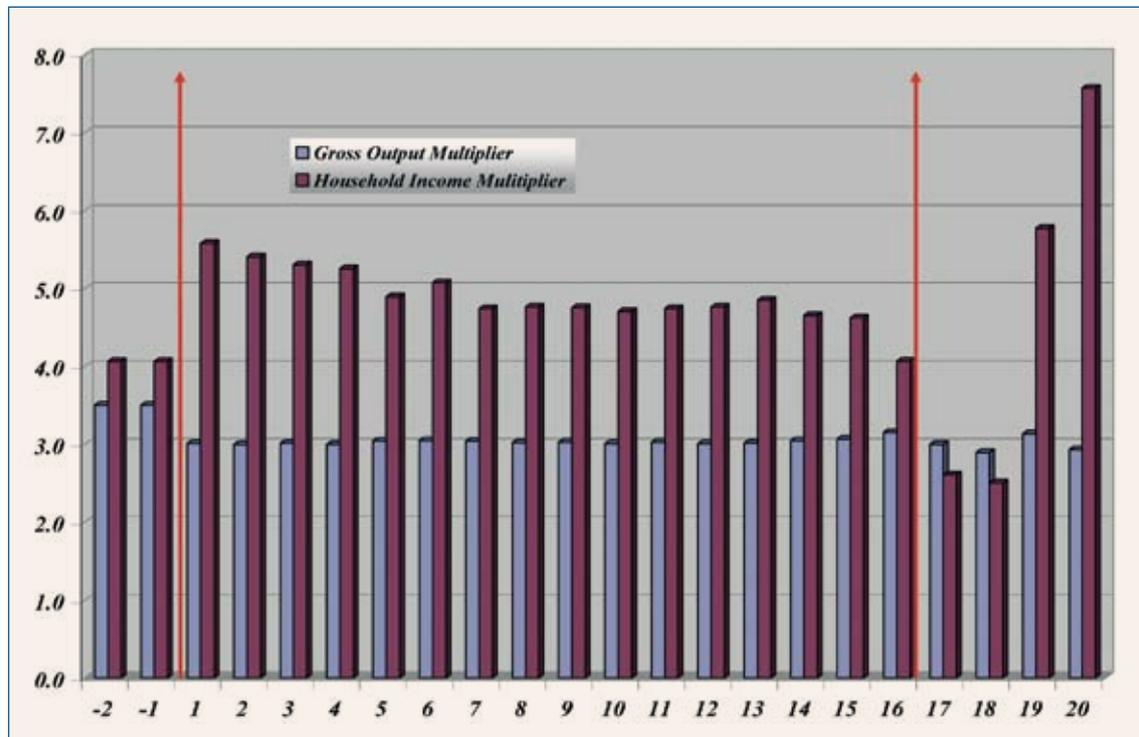
Results

The results are summarised for both the output and the income multipliers in Figure 4.3. They show the ratio of the *total project impact* relative to the *direct impact*. So, for example, a multiplier of three indicates that there will be two units of indirect effect for each unit of direct effect, making a total impact of three units. These results cover:

- (i) the two main construction years (to the left of the first vertical arrow);
- (ii) the 16 years of operation of the mine (between the first and the second vertical arrows); and
- (iii) the first four years of the closure process of the mine (to the right of the second vertical arrow). In this latter phase, the *absolute* amounts of direct and indirect spending both declines – the increase in the apparent multipliers in that period is merely the ratio of these two declining magnitudes.

Our interpretation of these results needs to take some account of the likely lags in the process whereby direct project spending generates indirect outputs from other sectors. Capacity constraints and other factors will mean, in practice, that not all the effects shown in Figure 4.3 will actually materialise in the *exact year* against which they are shown. However, by looking at this process over a sustained period, there is some reasonable assurance that the indirect and induced effects will arise, albeit with varying delays. So, for example, the relatively high multipliers of 3.5 (output) and 4.0 (incomes) during the *construction phase* probably over-state the full indirect response, because of the inevitable time delays in the local supplying industries gearing up to produce the full increase in gross output of almost \$400 million as quickly as the mechanical application of the I-O method may suggest. In the longer-duration operations phase, we can be more confident that the multipliers of circa 3.0 (output) and 4.5 (incomes) can be achieved through a gradual process of capacity increases in local supplying industries.

Figure 4.3 Output and household income multipliers



Data source: Calculated from RMP 2009.

It is important to note that while the output concept used in the I-O approach is a gross output concept, for the purposes of our calculations it can be used as a proxy for net output, because value added is assumed to be a fixed proportion of gross output in the calculations. Hence, the output multipliers can provide us with a basis for asserting that the total GDP effect of the RMP is likely to be some three times the magnitude of its direct effects. This suggests a total direct and indirect contribution to GDP of around 0.51% in a typical project year (when the direct contribution averages 0.17%) and 0.84% at its peak in Year 3. Over the main 18-year project duration, the **cumulative** impact would therefore be a level for GDP some 9% higher with the project than without it. This is the equivalent of \$19 billion.

Where do the main gains in output indicated by the multipliers come from? The answer, of course, depends on the pre-existing structure of Romania's productive system as indicated by the 2006 I-O coefficients. However, a quick summary of the sector-by-sector gains is presented in Table 4.1. The results there are ranked according to the size of the impacts seen in the construction period as in Year -1. They show the total direct, indirect and induced increases in gross output on a sector basis. The sectors shown are numbered by their order in the I-O tables. The sectors that are shown in the table are those amongst the 55 in the I-O tables that seem likely to experience the largest stimulus effects. So, we can see that during the construction phase (as represented by Year -1), the major benefiting sectors are, unsurprisingly, the machinery and equipment and the construction sectors. In the operational phase (represented by Year 6), the major benefiting sectors cover a larger range of activities including agriculture and food products, the power industries, transport, business services and chemicals. However, in both phases the multiple impulses allowed for in the I-O methodology disperse the stimulus across a wide range of sectors, with some of the effects likely to be in the local area of the mine as well as at the national level.

Table 4.1 The main expanding sectors (\$ million)

I-O number	Sector	Year -1	Year 6
23	Machinery and equipment	72.9	10.9
34	Construction work	72.3	17.9
9	Food products and beverages	46.4	23.0
1	Products of agriculture, hunting and related services	44.6	21.3
47	Real estate services	37.9	18.9
32	Electrical energy, gas, steam and hot water	27.4	58.9
36	Wholesale trade and commission trade services (except of motor vehicles and motorcycles)	26.8	14.6
39	Land transport; transport via pipeline services	24.1	15.5
53	Education services	16.2	2.3
48	Renting services of machinery and equipment without operator, and of personal and household goods	15.8	8.8
37	Retail trade services (except of motor vehicles and motorcycles); repair services of personal and household goods	14.4	6.4
21	Basic metals	13.2	4.4
38	Hotel and restaurant services	12.2	6.0
51	Other business services	11.2	12.7
55	Sewage and refuse disposal services, sanitation and similar services	10.8	5.9

43	Post and telecommunication services	10.1	5.6
20	Other non-metallic mineral products	9.3	3.8
28	Motor vehicles, trailers and semi-trailers	8.3	4.0
22	Fabricated metal products (except machinery and equipment)	8.3	3.1
17	Coke, refined petroleum products and nuclear fuels	6.3	16.7
42	Supporting and auxiliary transport services; travel agency services	6.1	3.4
18	Chemicals, chemical products and man-made fibres	4.7	14.9
7	Metal ores	4.5	1.2
19	Rubber and plastic products	4.4	1.9
44	Financial intermediation services (except insurance and pension funding services)	4.1	2.1
5	Crude petroleum and natural gas; services incidental to oil and gas extraction excluding surveying	3.7	8.4
54	Health and social work services	3.7	1.8

4.4 A closer look at the government budget

This section provides a more detailed quantified assessment of the likely impact of the project on government revenues and the overall fiscal position of the country. The analysis examines not only the large variety of taxes and charges to be paid to governments (at state – i.e. national – regional and local levels) by the RMP, but also the large dividend payments that will become due on the government shareholding.

The RMP will eventually be liable for a wide range of different taxes and charges. The listing of these is indicated in summary form in Box 4.2. The payments will be made to three different levels of government: the state (national), regional and local governments.

Box 4.2 How will the project be taxed?

The methodology used for projecting the future cash flows of the project has recognised two categories of tax payments:

- A. those that are closely linked in amount to the various costs incurred by the project (especially of those of labour, imports, and so on); and
- B. those that will vary in amount with the performance of the project in terms of volumes of production; achieved profitability, and so on. In practice, these represent the main bulk of the taxes to be paid.

The main type 'A' taxes, in order of their relative importance, are:

- Social security taxes on payroll;
- Payroll income taxes (to local government);
- Income taxes (to regional and also state government);
- Excise duties – mainly on diesel fuel;
- Land and building taxes (to local government);
- Forestry tax;
- Royalty on quarried materials;
- Construction permits (partly to local government);
- Exploitation licence;
- Customs duties and tariffs;
- Stamp duties on property transfers (to local government); and
- Withholding taxes on non-EU services.

The main type 'B' taxes in order of their relative importance are as follows:

- Income (Corporation) tax;
- Royalties on production;
- Withholding tax.

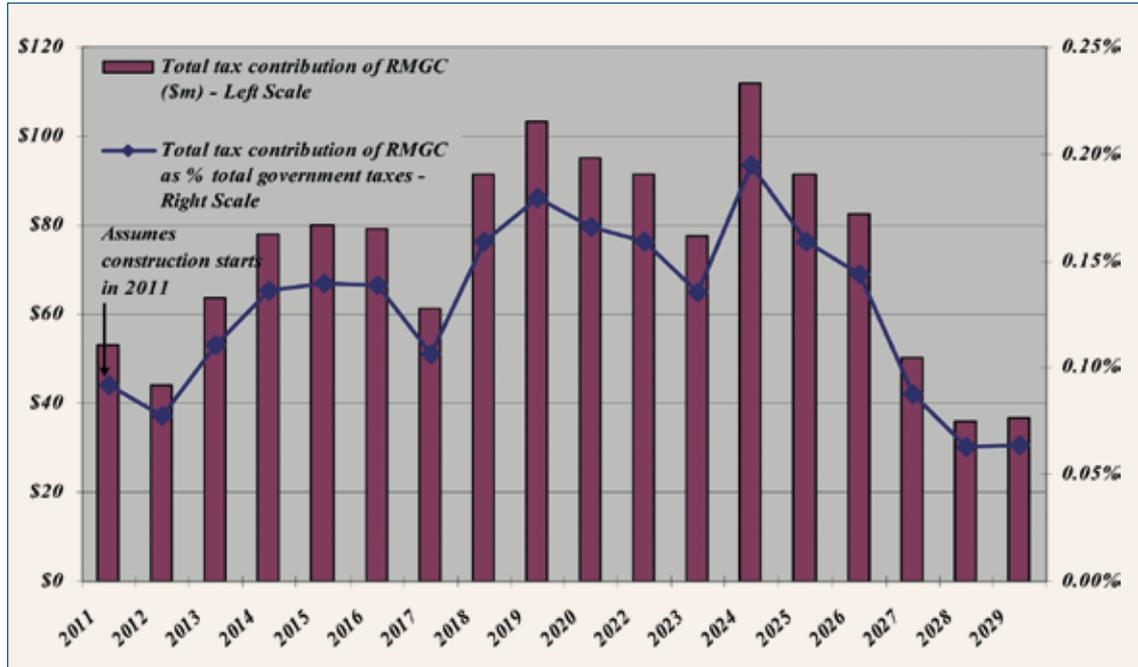
In addition, there are:

- Dividends paid on the government share in the project.

During the two-year construction period, and over the 16 years of operational life of the project, an average of \$48.6 million and \$76.8 million, respectively, will be paid in *taxes per annum* to the government. In addition, from Year 6, *dividend payments* – which are not, strictly speaking, a tax – start to be paid to a government-owned entity. Dividends peak in Year 11 at around \$54 million but, on average, are around \$25.8 million over the 15 years in which they are paid. Nevertheless, even by excluding these dividend payments the overall nominal sums of tax paid to the various levels of government are considerable, in absolute terms – peaking at \$112 million in Year 11. They also represent an important contribution to the total of tax revenues that the authorities can expect over the life of the project. Specifically, if the total taxes (excluding dividends) paid over the RMP life cycle (\$1.33 billion) were represented in NPV terms, at a discount rate of 10% they would total around \$593 million, and at 5% around \$859 million. This would be the equivalent of around 1% and 1.5%, respectively, of the total taxes received by the government in

2008. Overall, the taxes paid to government should be a valuable contribution over the life of the project, providing the various levels of government with dependable income streams that will allow it to spend more resources on expenditure priorities.

Figure 4.4 Total tax contribution of RMGC (\$ million)

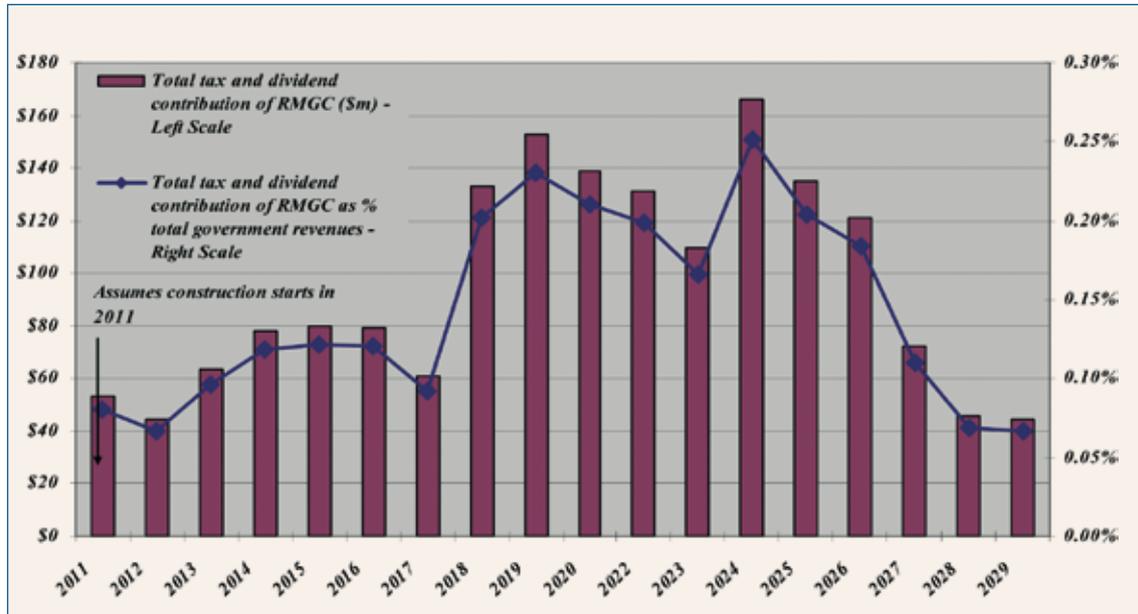


Data source: Calculated from RMP 2009

Notes: The peak of \$112 million in Year 11 is estimated to be 0.2% of the total taxes received by the government in that specific year. Because the revenue and cost projections for the RMP have been calculated in 2008 constant prices, we have assumed that total taxes received by the government are also held constant throughout the period at \$57.4 billion or 28.3% of the GDP figure for 2008 of \$202.74 billion, as referenced in the IMF June 2009 paper.

Over the life of the mine, a total of \$1.72 billion will be paid to the government in both taxes and dividend payments. The largest payments are in the form of social security payments, royalties, withholding tax, and income tax; and, in time, significant payments from dividends on the government's equity. The largest single year in which tax revenues and dividends are paid is Year 11 (see Figure 4.5). In this peak year, a total of \$166 million is paid to the government (of which \$54 million is a single dividend payment to a state-owned company).

Figure 4.5 Total tax and dividend contribution of RMGC (\$ million)

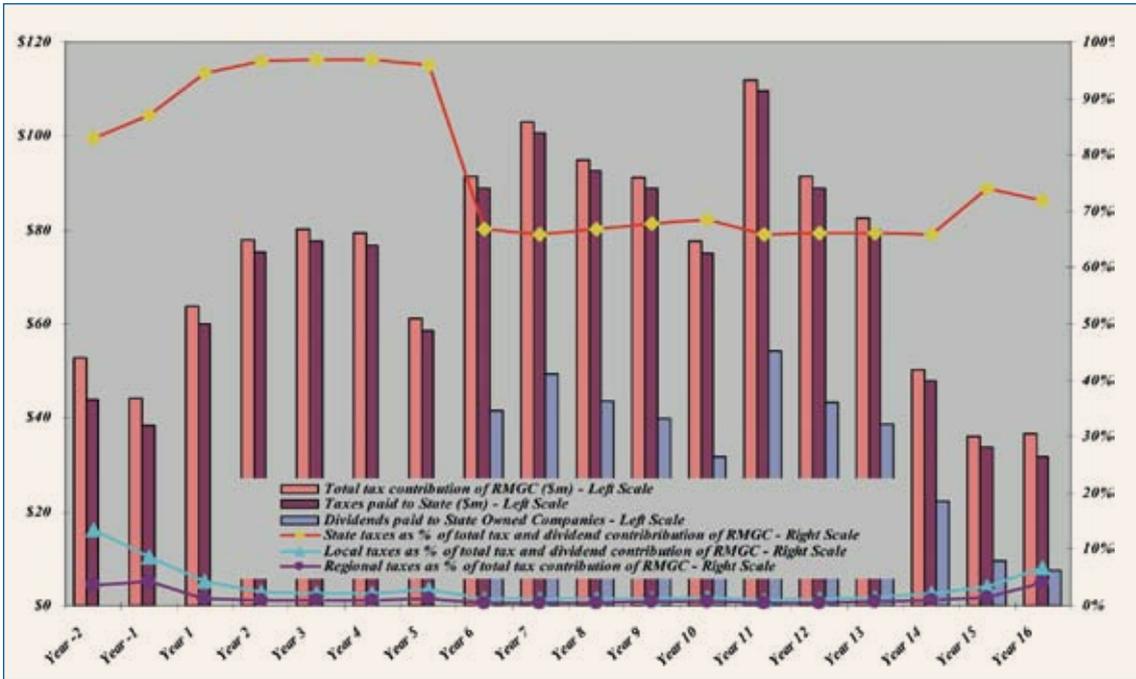


Data source: Calculated from RMP 2009.

Notes: The peak of \$166 million in Year 11 is estimated to be 0.25% of the total revenues received by the government in that specific year. Because the revenue and cost projections for the RMP have been calculated in 2008 constant prices, we have assumed that total government revenues are also held constant through out the period at \$66 billion, or 32.6% of the GDP figure for 2008 of \$202.74 billion, as referenced in the IMF June 2009 paper.

The vast majority of these taxes and dividends will be paid to the state government, rather than the local or regional governments. As can be seen from Figure 4.6, the contributions paid to local and regional governments peaks in the first year of construction (Year -2). In that year, \$9.1 million is paid to the local and regional governments, which thereby receive 14% and 4%, respectively, of the total tax and dividend contribution of RMGC. As a proportion of the total tax and dividend contributions paid to all levels of government, those tax contributions made to the local and regional governments are clearly rather low. In fact, even the statistical 'peak' of an 18% share going to the local and regional levels arises because the denominator in that year (i.e. the total tax and dividend payment from the project) is itself small at \$52.9 million. The finding that the proportion of taxes being paid by the company is skewed in favour of the national government is not, in itself, that surprising. However, this does not stop it from being a significant source of contention for lower levels of government, which often find that they do not have adequate budgetary resources to manage many of the project-related impacts. Nonetheless, a contribution of \$9.1 million, in nominal terms, is a relatively large amount and has the potential to allow the respective local and regional governments to undertake larger expenditures than would have otherwise been possible. *If they are able to use these funds to work in a complementary manner with the local spending of the company on various local projects, then the overall benefits of their spending have the potential to be exponentially larger than if they worked in isolation.*

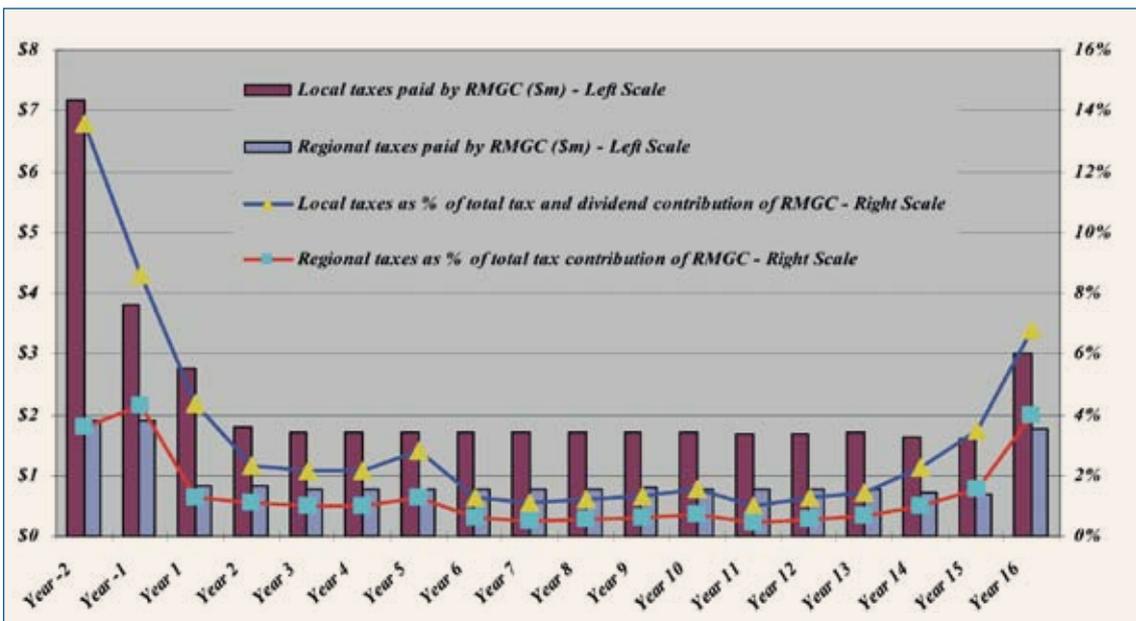
Figure 4.6 The budgetary impact of RMGC, Years -2 to 16



Data source: Calculated from RMP 2009.

The taxes paid at the local government level average \$2.25 million over the 18 years of construction and operation, and, in descending order of importance, comprise payroll taxes, land and buildings property taxes, construction permits, and stamp duty on property transfers. The regional contribution to taxes is even smaller, averaging less than \$1 million per annum over the 18 years of the project, and comprising mainly 'Income Tax – 13%' and 'Income Tax – 22% Special account'. The detail over the life of the project is summarised graphically in Figure 4.7.

Figure 4.7 The local and regional budgetary impact of RMGC, years -2 to 16 (\$ million)



Data source: Calculated from RMP 2009.

The net present value of project tax and dividend payments

At this stage in our analysis, it is helpful to provide a little perspective on what a sum of \$1.72 billion spread over the life of the project means for Romania's present day economic situation. In this respect, it is useful to discount the revenue stream from the project on an NPV basis by using a social discount rate. Because Romania is a mature industrial economy, a discount rate of 5% is entirely appropriate; however, given the high levels of poverty and low income levels in rural Romania, and in the project-affected area in particular, a higher discount rate of 10% is readily justifiable. Therefore, if the project revenues of \$1.72 billion received over the life of the project are discounted back to the year prior to when construction starts, the revenue to the government (including dividends) would equal \$719 million in NPV terms using a discount rate of 10%, and \$1,075 million using a discount rate of 5%. To put these numbers into context, in using a discount rate of 10%, the NPV of total tax and revenues paid by RMGC would be the equivalent of reducing the fiscal deficit for 2008 by 7.3% (and 10.9%, using a discount rate of 5%).⁶⁹ This hypothetical contribution to reducing the fiscal deficit is clearly an important and large contribution. It would, however, be misleading to use the aggregate fiscal take *over the whole life of the project* as a meaningful indicator of how fiscal deficits in the future may or may not be impacted by the project. For this purpose, the annual shares of total government revenue contributed by the project as shown in Figure 4.5 (right-hand axis) is more meaningful.

Revenue multipliers

The numbers discussed above relate wholly to the stream of government revenue that the RMP itself will generate directly throughout the construction and operational phases of the mine. These amounts are substantial. But there will, in addition, be some indirect generation of additional revenues for government. In much the same way that the direct project expenditures will precipitate further output, income and employment effects due to the increase in domestic economic activity so, too, will there be a further indirect increase in tax revenues.

This arises because domestic activities pay various indirect taxes that are linked to the level of the outputs that they generate. In addition, households and domestic companies pay direct taxes, linked to the level of their gross incomes. Hence, if the direct expenditures on domestic goods and services lead, as they will, to further (i.e. indirect and induced) increases in outputs and incomes, then government revenues are also bound to increase as well.

Estimates of the broad orders of magnitude of this revenue increase can be established on a *pro rata* basis by combining the estimates of multipliers on output and household incomes (as discussed in section 4.3) with the direct revenue effects of the project. Thus, crude estimates of the additional revenue coming from indirect taxes would be in the region of 1.5 to 1.75 times the magnitude of the project generated indirect tax revenues (i.e. the revenue multipliers on this element would be 2.5 to 2.75). This would occur as firms benefiting from increased production to supply the mine spend their additional incomes on other goods and services on which they are themselves taxed (the indirect effects). In addition to the inter-industry effects, the boost to the wider economy comes from increased income and consumption at the household level (these are the induced effects). Therefore, the overall impact of direct, indirect and induced effects from the project on government revenues might be as high as **4.0 times** the revenue contribution of the RMP. This could take the overall (direct, indirect and induced) tax contribution of the project up to \$6.8 billion.

These estimates could be further refined by taking into account any differences in taxes paid across the activity mix. However, this would require more detailed work and additional information that would be complex to assemble. It should also be remembered that any differences in taxes paid at the margin from what is paid on average will also affect the estimates: the multipliers described in this report have all used an *average* approach, so some degree of caution is needed in interpreting the results.

In addition, in some studies of this type the revenue of government from a mining project is assumed to

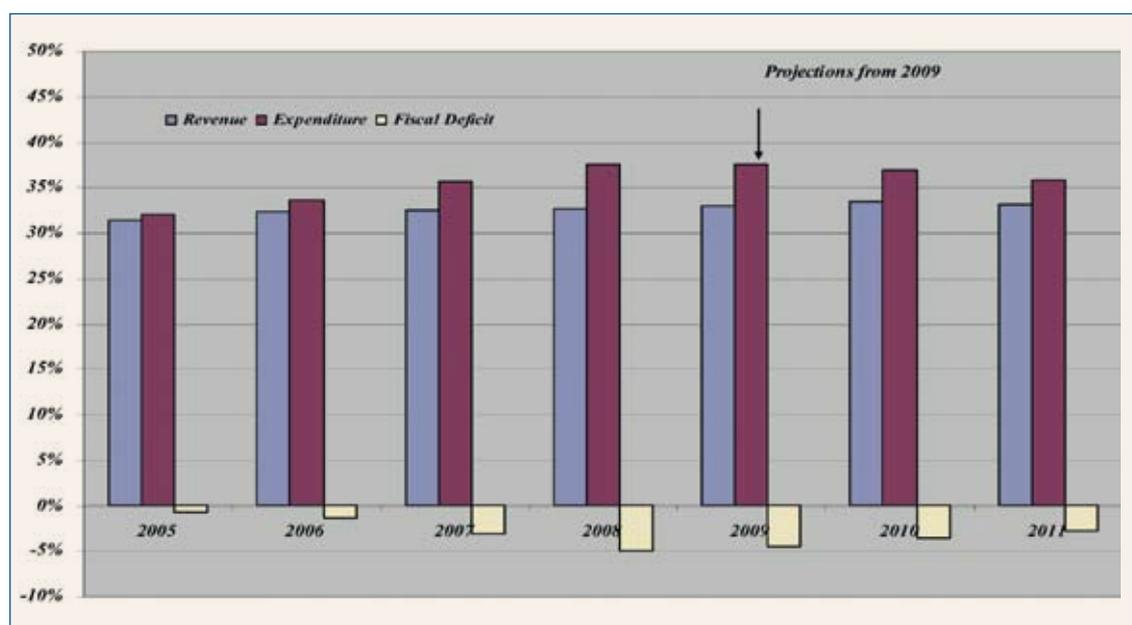
⁶⁹ IMF *Country Report* No. 09/183, June 2009, table 1: the fiscal deficit for 2008 is stated at \$9.9 billion or -4.9% of GDP, with GDP at \$202.74 billion.

be fully or partly spent, thereby creating second and subsequent rounds of incomes and further spending. Given the seriously impaired state of Romania's public finances, we have assumed very conservatively that the priority will be to use any additional revenues for the purposes of deficit reduction, rather than to boost expenditures. This is a strong and more limiting assumption, but realistic for the short term in the present circumstances. However, insofar as it is unrealistic for the later project years, we are understating the indirect effects of the project as there would be government re-spending multipliers. In theory, this could be of a similar magnitude to the private sector, if spent in the same manner – thus providing a further increase to economic activity and, thereby, taxes and employment within Romania.

The overall fiscal situation

Until 2007/08, Romania's fiscal position had been markedly robust for many years, following a five-year economic boom. However, during this expansionary period, as in previous booms before it, fiscal policy had been largely pro-cyclical – growing in periods of plenty and shrinking back during leaner times. The effect has been that, as government revenues grew, so did public spending, but at an even higher rate (doubling between 2005 and 2008). The result was that the fiscal deficit grew from 0.7% of GDP in 2005 to nearly 8% in 2009. The ability of the government to finance this fiscal gap became increasingly difficult during 2009 due to the global credit crisis, and the government has had to reduce spending and instigate a number of reforms to tax and expenditure policies. The medium-term aim of the government will be to reduce the fiscal deficit from its now estimated 8% in 2009 and to keep the deficit within 3% of GDP propounded by the convergence programme of Maastricht as a goal for 2011.⁷⁰

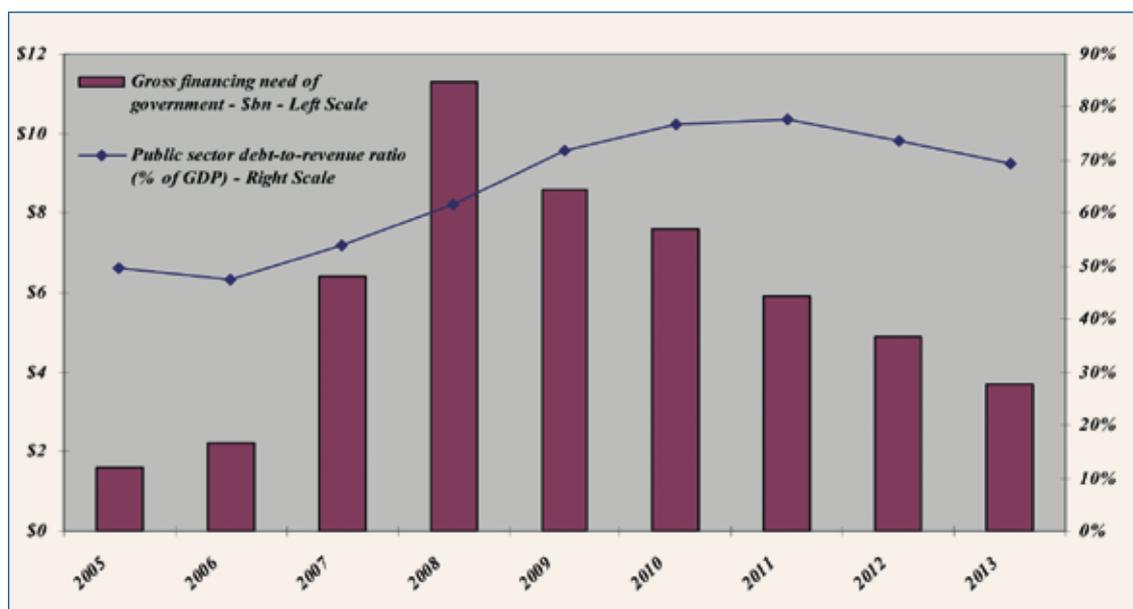
Figure 4.8 Government revenue, expenditure and fiscal deficit (% GDP)



Data source: IMF Figures 2009 (IMF June 2009, 09/183, table 4). The graphic was produced prior to the downward revisions announced at the end of July 2009.

The economic shocks arising from the global economic turmoil of 2008/09 are expected to continue to impact upon the budget deficit and gross financing needs of Romania for several years to come. The gross financing need of the government over the next 4 years is vast in comparison with previous years and at certain points in time is expected to be nearly 4 times greater than anything experienced in the past 6 years. Represented as a ratio of public sector debt-to-revenue, the government is expected to face a worsening situation up to and including 2011 when the public sector debt-to-revenue reaches a peak of 77.6% (see Figure 4.9).

70 The Stability and Growth Pact.

Figure 4.9 Fiscal background during the early years of the Roșia Montană Project

Data source: Calculated from IMF June 2009, 09/183, table 7.

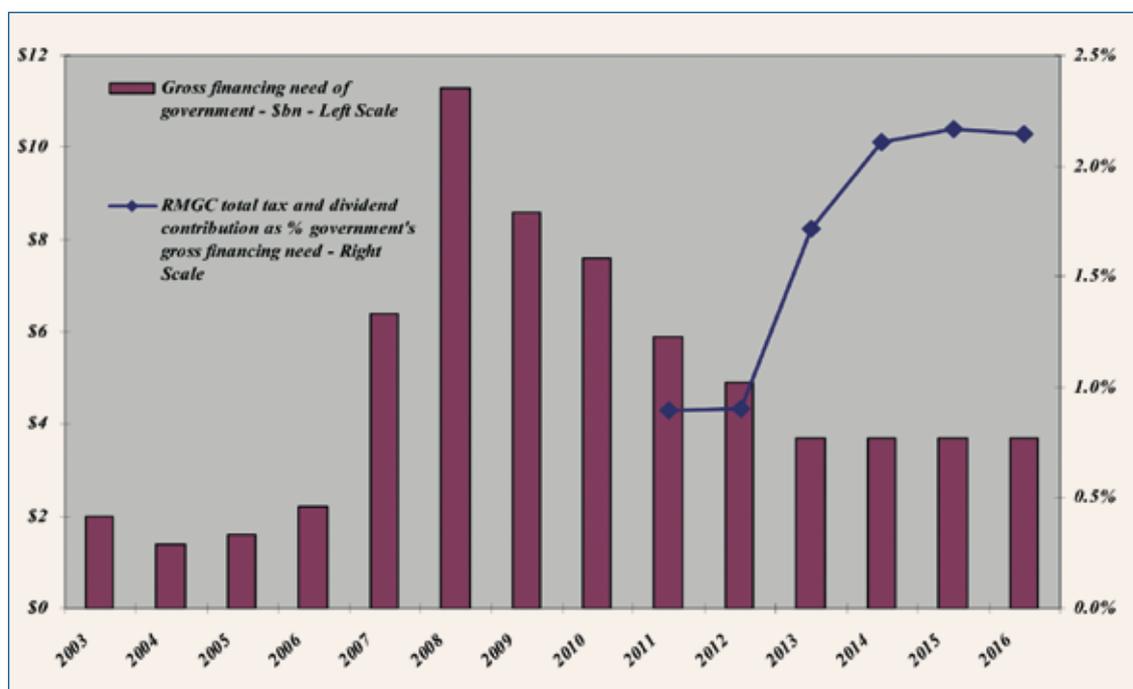
Similarly, when rising external debts are represented as a proportion of falling exports, the impact of the global credit crisis on external debt sustainability is stark. The period of greatest concern for the government in this regard is probably 2009 and 2010, when the external debt-to-exports ratio hits 196.4% – double the 2003/04 ratio.⁷¹ Therefore, there is little doubt the fallout from the global financial crisis will certainly provide a defining and challenging fiscal background to the early years of the RMP. In fact, it is hard to imagine a point in time during the past 10 years when the potentially large and sustained contributions made by the project to the government's finances and exports in particular could have come at a more important juncture.

The payment of \$1.72 billion of taxes and dividends spread over the life of the project by RMGC will help in the reduction of the government's budget deficit, and so contribute to the country's economic recovery. Figure 4.10 provides summary data that illustrates the orders of magnitude and shows that, in the first year of operation (assumed to be 2013 for purposes of illustration), the total taxes and dividends paid by the RMP of \$63.6 million are the equivalent of 1.7% of the anticipated gross financing need of the government for that year; this increases to 2.2% by the third year. This illustrates how the project will be crucial in creating 'fiscal space' to accommodate further fiscal shocks and/or address some of the social and other economic difficulties facing the country (such as the anticipated pension deficit in 2011 of 2% of GDP, and the need to maintain co-financing with EU funds on key capital spending projects).

The gross financing need of the government was anticipated by the IMF in June 2009 to start to ease from its peak in 2008 of \$11.3 billion, as shown in Figure 4.10. However, it is highly likely these figures will be revised as further information on the extent of the contraction in revenues is known. The latest indications are that, with revenues falling by 5.1% of GDP in 2009 and expenditures expected to grow by 5.6% of GDP in 2009, the gross financing need of the government may not fall as quickly as predicted. This would require the government to seek agreement from the IMF for a higher budget deficit of 7% of GDP in 2009 (revised up from 4.6%).⁷²

71 IMF June 2009, 09/183, table 8.

72 Thomson Reuters, 8 February 2009.

Figure 4.10 RMGC contribution to gross financing need (\$ billion)

Data sources: Calculated from RMP and IMF Figures 2009 (Public Sector Debt Sustainability Framework, 2003–2013, IMF June 2009, 09/183, table 4).

Notes: Defined as public sector deficit, plus amortisation of medium- and long-term public sector debt, plus short-term debt at end of previous period. IMF projections up to 2013, thereafter assume gross financing need remain constant at \$3.7 billion.

4.5 A closer look at direct and indirect employment

This section will provide a quantified assessment of the likely impact of the project on both direct and indirect employment. The estimates of direct employment can be deduced from the information provided by the RMP team. The calculation of the additional indirect employment derived from I-O-based multiplier calculations follows.

Direct employment

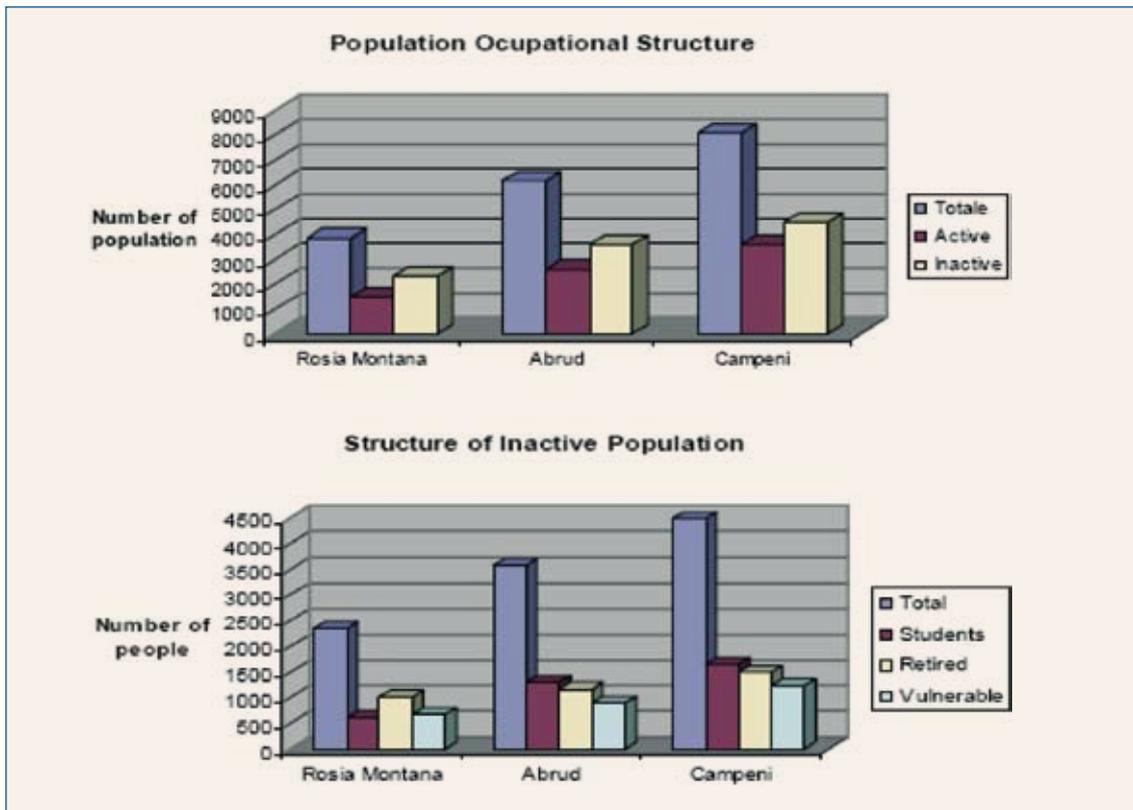
The new *direct employment* opportunities created by the RMP will be one of the most significant contributions of the project at the local and regional level. During the initial two-year *construction phase* from 2011, the estimated Romanian labour demands of the project reach their peak. At that stage, a total of 2,391 workers are estimated to be required, of whom 2,337 will be Romanian workers either *employed* directly or *contracted* directly by the company. This brief period of intense construction and mine activity will generate a total wage bill in excess of \$63 million per annum, much of which will be spent locally by workers on various household and consumer-related goods and services. The engagement of large numbers of foreign staff is not anticipated, even during the two-year construction phase when there will be only an estimated 54 expatriate workers. Thereafter, during the operational phase, the numbers of expatriate staff will fall to an average of six out of a total workforce of 887. Thus, almost all of the employment benefits of this phase will accrue to Romanian workers in an area of acute unemployment.

According to the 2002 census,⁷³ there were an estimated 6,195 people in the town of Abrud, 8,080 in Campeni and 3,865 people in the comuna (rural commune) of Roșia Montană (this last figure is taken from The Non-Technical Summary, ch. 10). However, not all of these people will be available to join the potential

73 <http://www.insse.ro/cms/files/RPL2002INS/vol5/tables/t02.pdf>

labour force.⁷⁴ We know that since 2002 numerous jobs have been lost in the mining industry, and the Community Sustainable Development Programme report states the *economically inactive* population in Roșia Montană was as high as 61%. This would mean that, of the 3,865 people in the Roșia Montană comuna, only 1,546 people are economically active.⁷⁵ However, it is not immediately clear what proportion of the remaining 2,319 people in Roșia Montană are potentially employable by either the mine, or by expanding local businesses as economic opportunities related to the mine increase. The data indicate that – after removing those already in employment, students and retired people from the potentially employable – there remain only the ‘vulnerable’ who could add to the employment pool of labour. Of this group, some are ‘engaged in family duties’, which presumably could not easily be given up even if a suitable employment opportunity existed within the mine. A similar picture emerges for Abrud and Campeni, where it is known that the proportion of economically active people is around 42% and 44%, respectively.⁷⁶

Figure 4.11 Economically active populations in affected areas



Source: Community Sustainable Development Programme, Alba County statistics

Although, as described, the mine-affected areas suffer from acute unemployment, there is expected to be a need (in the short term) to recruit some of the 2,337 Romanian construction phase workers from various areas of the country, including some from *beyond* the affected areas. For the moment, the RMP team is estimating that the numbers of workers to be engaged from *other parts* of the country will total more than 590 persons. But this will still leave over 1,745 new jobs to be filled by persons from the *local and regional* areas of Roșia Montană. However, we must remember that the total population of the immediate communities affected by the mine is only about 18,000 persons, with the active labour force likely to be only around 3,000 to 4,000 persons. So, *the labour demands of the project in the short term will certainly spill over to require some inward migration, either from the broader region or from the national labour pool more*

74 The Socio-Economic Baseline Report of 2003 states that the 1992 census revealed there was an estimated economically active population in the Abrud orasul of 3,152; 1,799 in the Roșia Montană comuna; and 4,406 in the Campeni orasul.

75 Non-Technical Summary Report, ch. 10, p. 53.

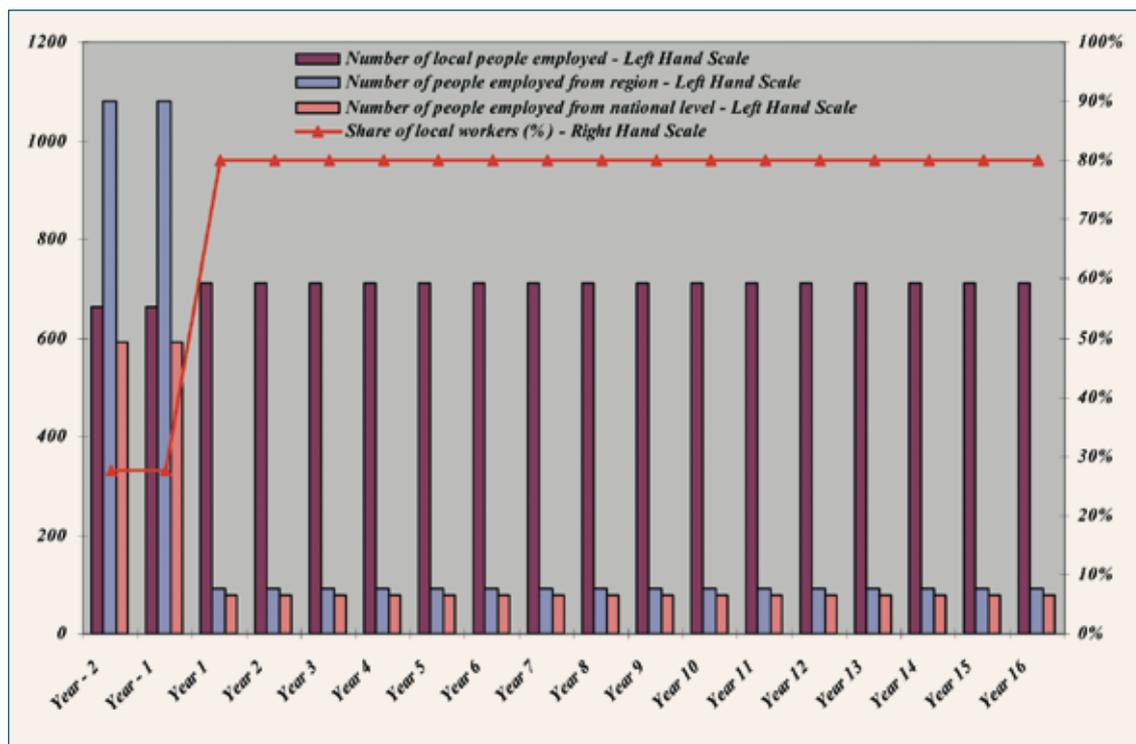
76 Community Sustainable Development Programme, p. 42.

generally. There are potential social and other consequences of this – and not least because of its temporary nature – that will need to be recognised and managed well.⁷⁷

To expand this important issue further, in estimating the extent of likely inward migration from other parts of Romania, it will be critical to investigate more fully the potential labour supply constraints of the area. This is important, as there is a readily identifiable risk that few people will be taken out of unemployment and that the mine merely results in a transfer of currently employed people attracted by probably higher wages. Notwithstanding this, it is known that a large number of previously economically active people are unemployed following the closure in 2006 of two mines, in Roșia Montană and Abrud. During the restructurings of these mines, in 2004 alone, around 1,002 and 1,286, respectively, were made unemployed.⁷⁸ However, whether they have remained in the area and still have readily employable skills is not known.

Turning to the longer-term *operations phase* of the mine from Year 1 (estimated as 2013 to 2030), an estimated 887 *direct* jobs (only six expatriates) will be created during this 16-year period of operation, of which 803 jobs will be created at the local and regional levels.⁷⁹ In addition, an estimated 78 jobs will draw on employment at the national level. Figure 4.12 provides a graphical summary of the direct employment effects of both phases of the project. The big increase in the share of local workers after the first two construction years of the project is shown vividly by the right-hand scale in this figure.

Figure 4.12 Direct employment, years -2 to 16



Data source: Calculated from RMP 2009.

77 As the Supplementary Lenders Information Pack (SLIP) (p. 169) notes 'It can be anticipated that in-migrants as a whole will have demographic characteristics (e.g. age, sex and ethnic background) that differ from those of the existing population'.

78 Ibid.

79 This includes those engaged directly by the company, those additional full-time equivalent jobs created (and directly calculable by) but not involving employment by RMGC, and transportation jobs. It excludes the number of people employed by suppliers of equipment and materials. The number of people employed for closure (270 workers from the local level) has not been considered in detail, although there is an expectation that labour engaged to deal with closure activities starts in Year 6 and continues to Year 27.

Since a large proportion of the new workers (in both the construction and the operating phases) will be drawn from much lower-paying jobs, possibly in agriculture, and/or drawn out of unemployment or underemployment, there will be an undoubted and large social gain to the local and regional economy from this large number of people being employed. This can be measured by the gap between the actual wages paid by the project and the shadow wage associated with the existing work (or unemployment) of the newly recruited workers. We have not had sufficient data available to us to assess the match as between the skills already available in the more local areas and the specific demands for labour that the project will generate. This is a possible topic for further work at a later stage. Furthermore, additional detailed work is needed to understand how the initial demand for 2,337 workers during the construction phase and 803 people during operations will be sourced from the local and regional levels. Official unemployment figures are likely to mask the full extent of those unemployed or underemployed people in the affected area. However, because of the potentially negative effects that inward migration can have on social cohesion in communities, great care should be taken by the company to prepare adequately for and manage the effects of a migrating workforce.

Direct income generation

The engagement of 881 Romanian workers during the 16-year operational phase of the project will contribute to the economy a wage bill of, on average, \$22 million per annum (see left scale of Figure 4.13).⁸⁰ Salaries of those employed by RMGC will be higher on average than other jobs available in the area, which are estimated at \$522 per month for those in construction and industry, \$543 in agricultural activities, and \$592 in services (gross average monthly incomes in Alba County in 2008). Indicative figures from the company show that average gross monthly salaries for Romanian workers employed by RMGC will be around \$1,233, with the largest group of workers (230 staff) paid \$836 per month.

Figure 4.13 Financial contribution to the economy from direct employment, Years -2 to 16 (\$ million)

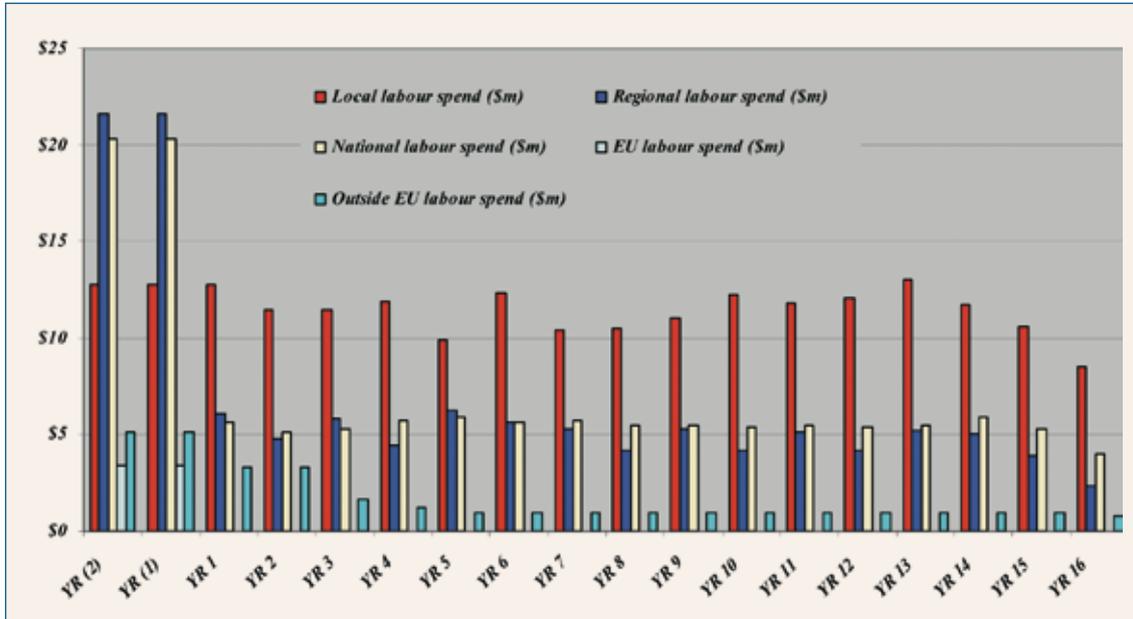


Data source: Calculated from RMP 2009.

⁸⁰ The wage bill includes the employers' and employees' contributions to taxes.

It can be seen that the most intense period of employment will be in the early years of the construction period. Figure 4.14 shows that around \$13 million will be spent on local workers. This will provide a major boost to a demoralised economic community. The distribution of these annual total amounts across the various Romanian and international sources of the labour is presented graphically in Figure 4.14.

Figure 4.14 Breakdown of labour spend at the local, regional, national and international levels, Years -2 to 16 (\$ million)



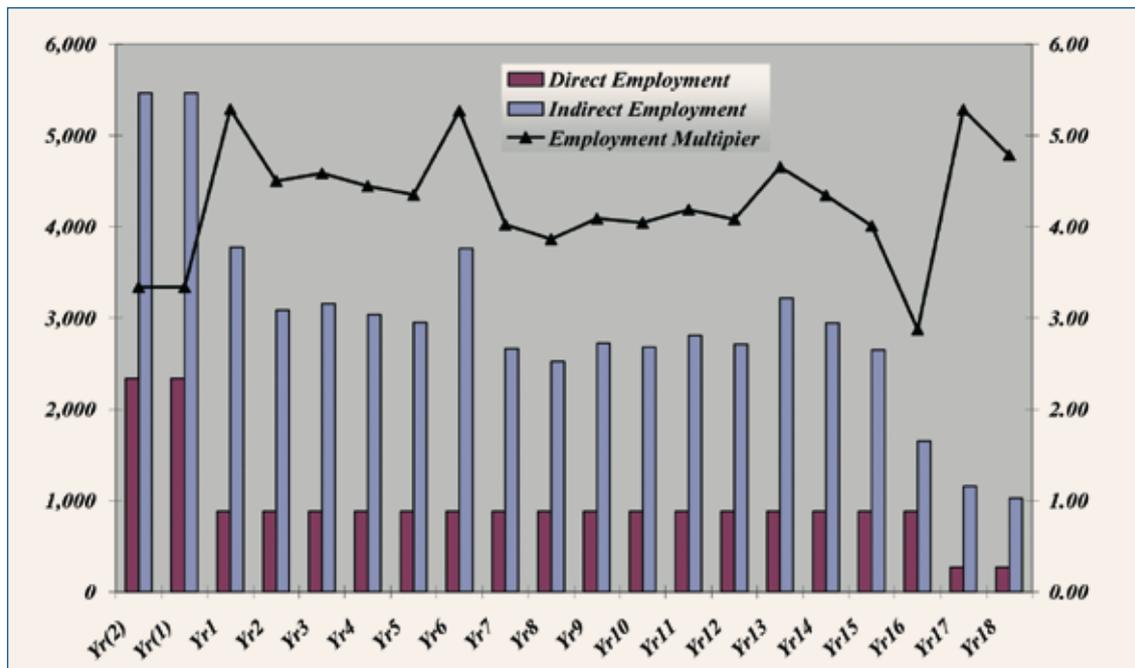
Data source: Calculated from RMP 2009.

Notes: The graph excludes labour engaged for managing the closure of the mine, expenditures which are expected to start in Year 6 and continue until Year 27.

4.6 Indirect job creation: multiplier results

‘The employment multiplier associated with a particular regional economic stimulus is designed to yield an estimate of the total employment attributable to the stimulus per job or man-year of employment directly created.’⁸¹ The methodology here follows that described above for output and incomes but, in addition, it uses nationally estimated ratios of employment numbers to wages paid. This is necessary to translate the dollar amounts into numbers of employees (details are in Technical Annex B). The results on a year-by-year basis are presented in Figure 4.15. The left-hand axis shows the results in numbers of persons, and the right-hand axis shows the calculated multipliers.

81 H.C. Davis (1990), *Regional Economic Impact Analysis and Project Evaluation*, University of British Columbia Press: p. 37.

Figure 4.15 Direct and indirect employment

Data source: Calculated from RMP 2009.

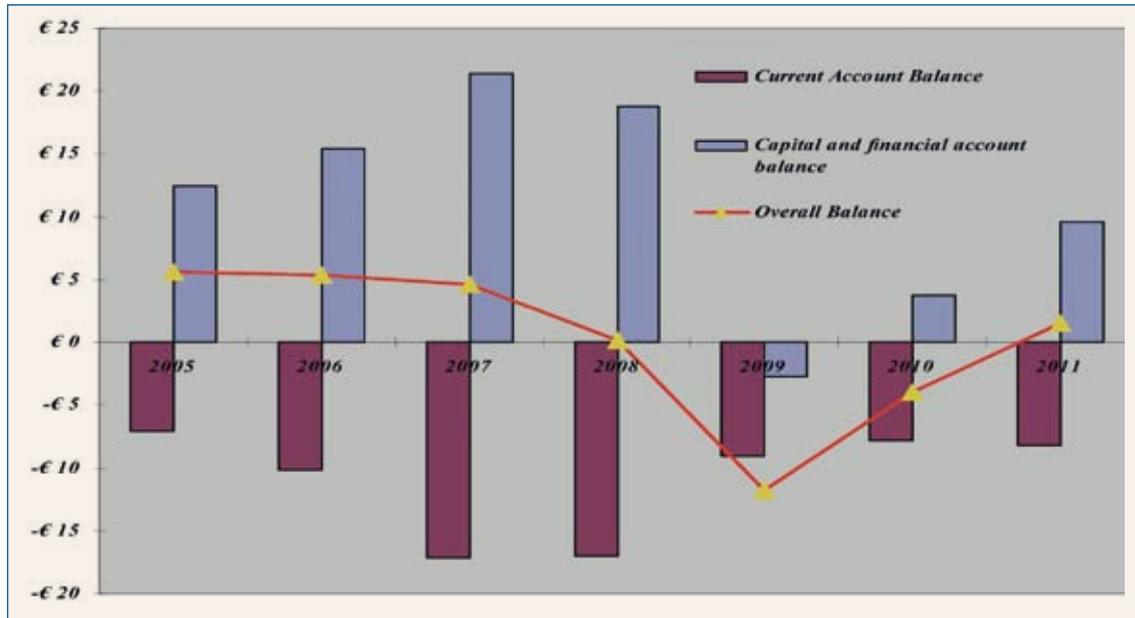
It is clear that the indirect employment created as a result of the project could be a significant multiple of the direct employment numbers. The direct Romanian employment numbers, including the operational phase, are typically of the order of 881 persons. By contrast, the indirect employment numbers in some years are in excess of 3,000 persons, thus, in these years, the direct, indirect and induced total of labour created by the project will total 3,881. However, these results clearly depend on the achievement of the expansions of the main supplying sectors as listed in Table 4.1. Appropriate facilitating supports from policies and the programmes of government will be needed to achieve some of the large employment gains.

4.7 A closer look at the balance of payments

This section provides a quantified assessment of the probable impact of the project on the country's present balance of payments situation, including both the current account and capital account components.

Romania's balance of payments situation prior to the global financial crisis at the end of 2008 had been reasonably healthy.⁸² For most of the past 10 years, there have been large current account deficits, but these were not of great concern so long as they could continue to be comfortably financed by sizeable FDI inflows and foreign loans in the capital account. For many years, this was the case and there was an overall balance that was positive until 2008 (see Figure 4.16).

⁸² The balance of payments (BoP) is a statistical statement that systematically summarises, over a given period of time, all the transactions of an economy with the rest of the world.

Figure 4.16 Balance of payments, 2005–11: Projections from 2009 (€ billion)

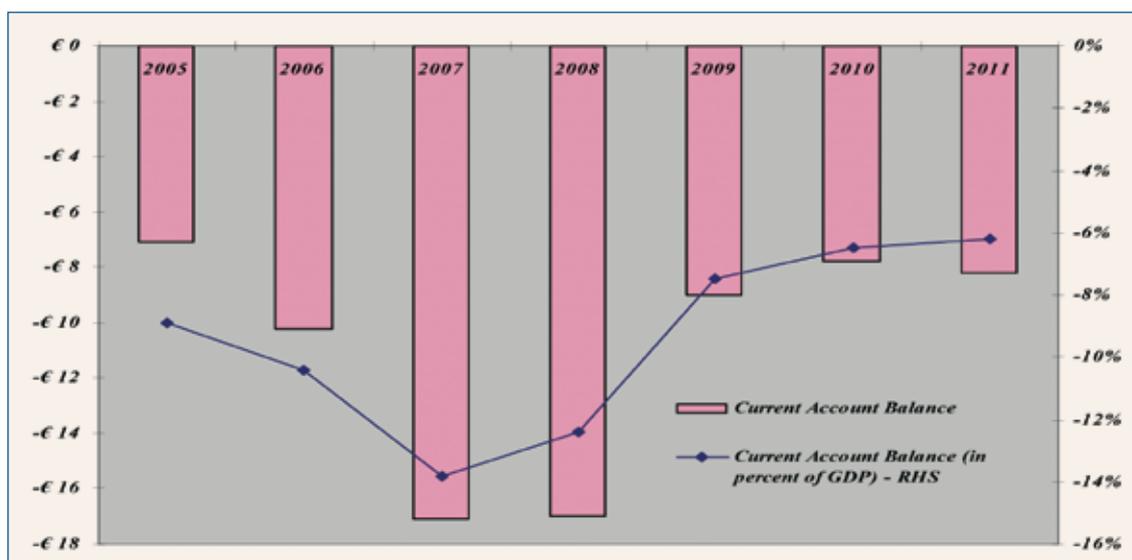
Data source: Calculated from IMF Figures 2009 (Romania: Balance of Payments, 2005–2011, IMF June 2009, 09/183, table 2, projected data from 2009 onwards).

As can be seen from Figure 4.16, by the end of 2008 the picture had changed dramatically. Gross international reserves, which had been high for a long time and provided at least 6 months of import cover between 2004 and 2007, have subsequently fallen to around three months.⁸³ The concern now is whether the current account deficit can be financed by further inflows of FDI and foreign capital. The full effects of the global financial crisis have yet to be seen, but it is widely expected that matters will become increasingly difficult as most of the economies in Europe slow down and the incentive to locate FDI in Romania declines. In addition, for those businesses already based in Romania, the intra-company financing that, to date, has supported local subsidiaries such as banks and export orientated manufacturing units is expected to become increasingly scarce. Ultimately, the slow down of both new and existing investments in these areas is likely to work through the system to affect local incomes and domestic consumption. In time, this should also slow the growth of imports, thereby leading to an *eventual* improvement in the current account deficit. But this type of adjustment may be slow to work itself out and, in the meantime, Romania faces ongoing macroeconomic difficulties and potential instability.

Current account

Looking at the current account in more detail, the overall balance in 2008 showed a deficit of €17 billion (or \$25.2 billion), which equates to 12.4% of GDP, only marginally better than 2007 when it was a staggering 13.8% (see Figure 4.17).

83 Rabobank data: http://overons.rabobank.com/content/images/Romania09%20update_tcm64-82352.pdf

Figure 4.17 Current account balance, 2005–11: Projections from 2009 (€ billion)

Data source: IMF Figures 2009 (Romania: Balance of Payments, 2005–2011, IMF, June 2009, 09/183, table 2; projected data from 2009 onwards).

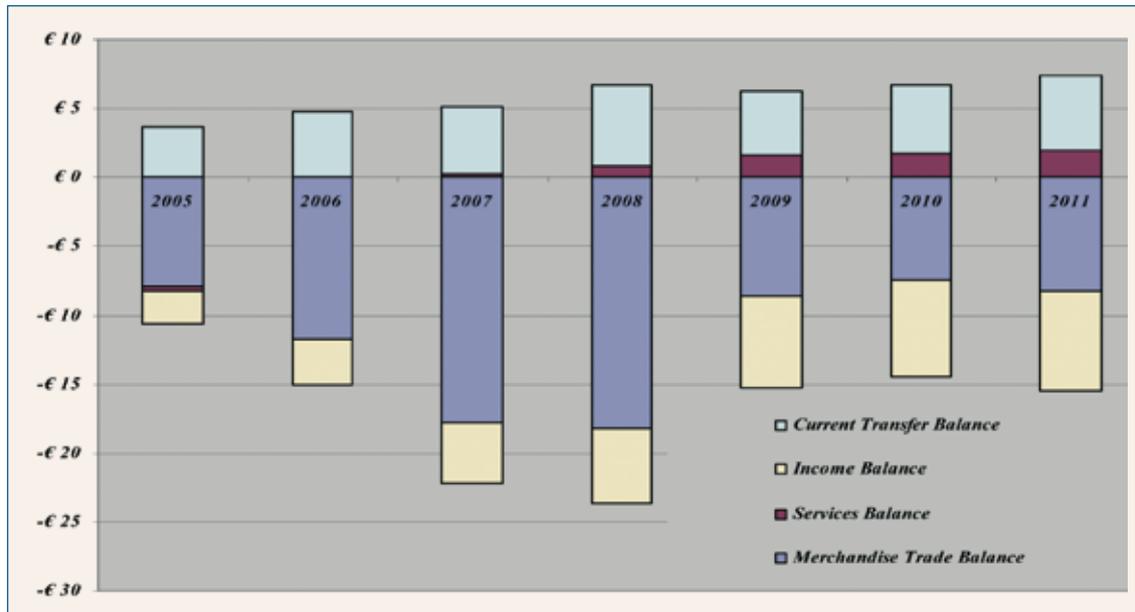
The disaggregation of the current account balance identifies consistently large deficits in the *merchandise trade* balance (imports, on average, have been 50% larger than exports) and the *income balance*.⁸⁴ In the case of the income balance, this is projected in the latest IMF assessment to deteriorate even further as overseas payments for debt and equity (interest and profits) dwarf incoming receipts. These large external deficit elements have typically been partially offset by relatively small but consistent surpluses in the current transfer balance (mainly comprising donor grant funds and overseas workers' remittances). Similarly, the services balance, which has turned positive in recent years, is projected to continue to be positive as exports of non-factor services (transport, insurance) significantly outpace the imports of such goods (see Figure 4.18).

As a 'snap-shot' for the latest year for which we have firm data (2008), the data for the current account show:

- the merchandise trade deficit was relatively large at \$26.97 billion;
- the services trade balance was marginally in surplus at \$1.18 billion;
- the income balance was in deficit at \$8 billion, which included an outflow of \$11.56 billion for interest on public and private debt; and,
- the current transfer balance – which records remittances, gifts, and grants – was in surplus at \$8.74 billion.

Figure 4.18 provides a summary of these components, and comparison with the three previous years up to 2008 (in Euros) and three future years as projected in the most recent IMF assessment.

84 The current account is used to assess and bring together the inflow and outflow of goods and services into and from a country. The first line within the current account is the Merchandise trade balance, which comprises credits and debits on the trade of goods such as raw materials and manufactured goods that are bought, sold or given away in the form of overseas aid. Second, the Services balance refers to receipts from tourism, transportation, engineering, business service fees and royalties from patents and copyrights. Third, the Income balance records earnings on investments, both public and private, which comprise receipts from income-generating assets such as stocks (in the form of dividends). The last component of the current account is the Current transfer balance, which comprises credits mainly from workers' remittances (salaries sent to the home country of a national working abroad), as well as foreign aid that is directly received.

Figure 4.18 Current account balance breakdown, 2005–11: Projections from 2009 (€ billion)

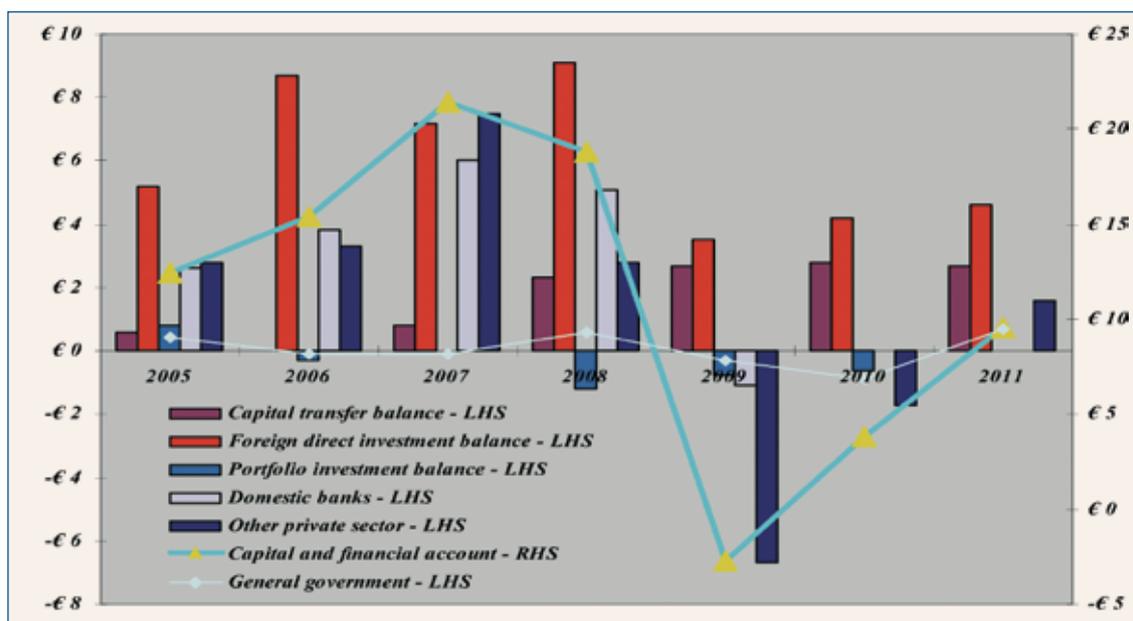
Source: IMF Figures 2009 (Romania: Balance of Payments, 2005–2011, IMF June 2009, 09/183, table 2; projected data from 2009 onwards).

Capital account⁸⁵

The capital account position is summarised in Figure 4.19. It can be seen that the surplus witnessed over the past four years has been the result of steady inflows of FDI, and other investments that have gone mainly into the private sector, with some significant net inflows to the domestic banking sector. Unfortunately, the expectation now is that, with the global economic crisis already impacting upon the real economy, there will be considerably less interest in shifting production facilities to Romania in the coming years. This impact can already be seen in a significant fall in investments into the private sector in Romania, where the IMF now projects that the overall capital and financial account balance will turn negative in 2009: with some hope – obviously speculative at this time – that there can be a modest recovery from 2010.

85 The Capital (including the Financial) Accounts: Along with transactions pertaining to non-financial and non-produced assets, the capital account relates to dealings including debt forgiveness, the transfer of goods and financial assets by migrants leaving or entering a country, the transfer of ownership on fixed assets, the transfer of funds received to the sale or acquisition of fixed assets, gift and inheritance taxes, death levies, patents, copyrights, royalties and uninsured damage to fixed assets. Detailed in the financial account are government-owned assets (i.e. special drawing rights at the IMF or foreign reserves), private sector assets held in other countries, local assets held by foreigners (government and private), foreign direct investment, global monetary flows related to investment in business, real estate, bonds and stocks.

Figure 4.19 Capital and financial account balance, 2005–11: Projections from 2009 (€ billion)



Data source: IMF Figures 2009 (Romania: Balance of Payments, 2005–2011, IMF June 2009, 09/183, table 2; projected data from 2009 onwards).

The effects of Roșia Montană on the balance of payments

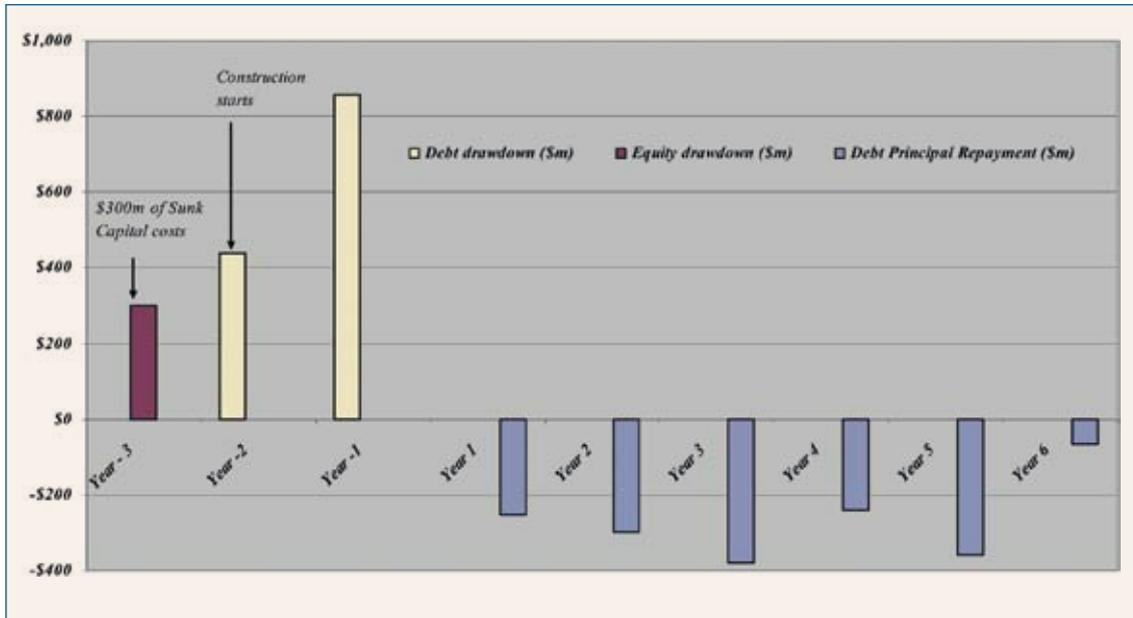
The effects of the RMP on this situation are highly significant in terms of both the current and capital accounts. The anticipated effects are as follows:

Construction phase

During the initial two-year construction period, it is anticipated there will be a large but one-off inflow of around \$190 million per annum of imported goods and services. This will temporarily increase the current account deficit by the equivalent of about 0.75% of the 2008 current account balance: this is significant in the current context. These imports will show up in both the merchandise trade balance, where there is expected to be a surge in *capital equipment imports* (major mining equipment and process capital); and in the services balance, as EU and other foreign workers help to construct and operationalise the mine.

Offsetting this effect will be the short-term boost to the capital account and the financing component of the balance of payments. Specifically, the imports seen in the current account will be matched in the capital account by a flow of FDI receipts of around \$440 million in the first year of construction, followed quickly in the second year of construction by a further investment of \$860 million. In total, it is expected that during these initial two years there will be total debt inflows to the country of around \$1,300 million. The detailed pattern of these one-off inflows and the later debt repayments is shown in Figure 4.20. It should be noted that, in Figure 4.20, a sum of \$300 million is shown in Year -3 as flowing into the country as equity. The spending of these monies (sunk costs) will, in fact, have occurred over a much longer period of time but, for presentation purposes, are represented as a one-off inflow of equity prior to construction starting.

Figure 4.20 The impact of the Roșia Montană Project on the capital account (\$ million)



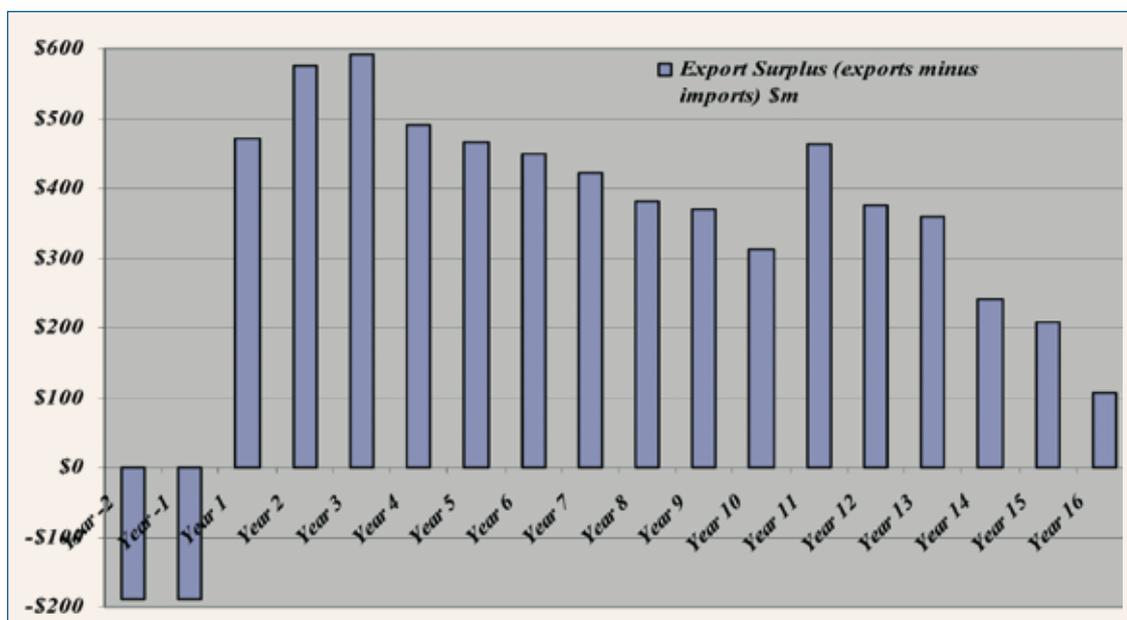
Data source: Calculated from RMP 2009.

Overall, the impact of the project on the balance of payments as a whole is a positive one during the construction phase: the huge capital account inflows of \$1,300 million offsetting the large import bill (see Figure 4.23). It is also relevant to note that the import surge will itself be relatively limited, because of the high domestic spend on goods and services sourced in Romania (around \$250 million in each year of construction – larger than the annual import bill). It is primarily due to the high potential for buying many goods and services from Romanian sources, even in the construction phase, that the net effect on the overall balance of payments is expected to be positive. Figure 4.23 shows that the increase in the current account deficit in the two-year construction period due to the importation of goods and services for construction is more than adequately offset by the increased surplus in the capital account.

Operational phase

During the 16-year operational phase, there will continue to be some level of imported goods and services to the project, estimated at around \$75 million per annum, including items such as key inputs in the operating process (cyanide and grinding media). However, the imports of goods and services in this phase will always be considerably smaller than the export of \$467.5 million per annum of gold and silver that is expected on average over the 16-year operational life of the mine.

Figure 4.21 Roșia Montană Project export surplus (exports minus imports of goods and services), constant 2008 prices (\$ million)



Data source: Calculated from RMP 2009.

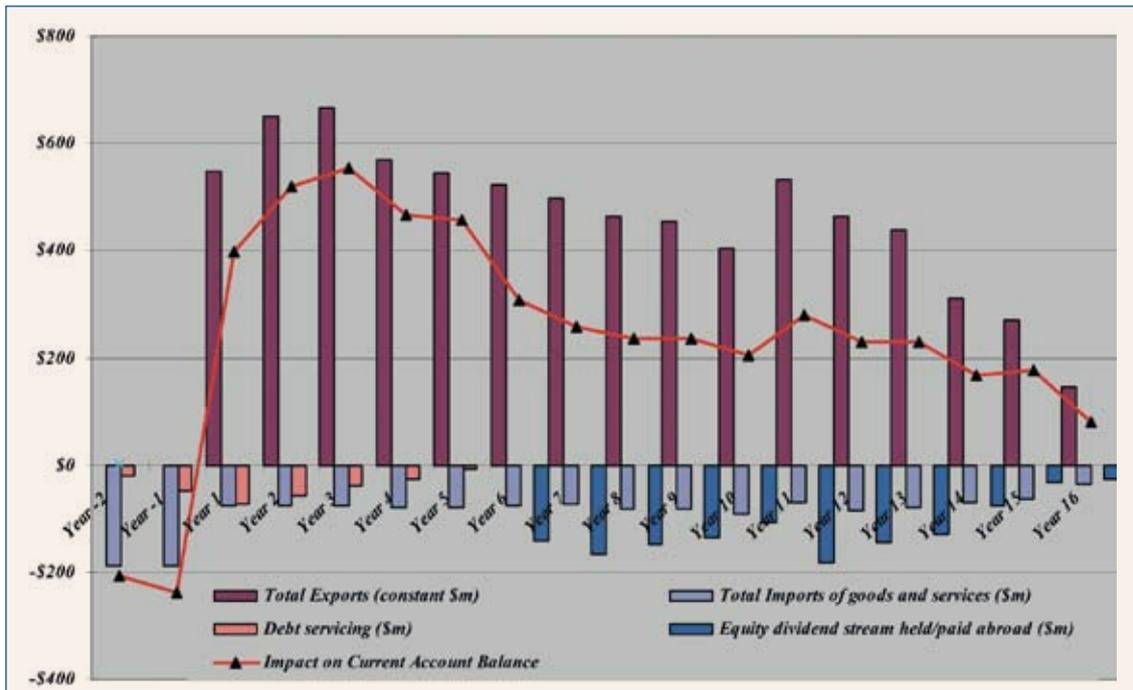
However, the export surplus (gold and silver exports minus imported goods and services – shown in Figure 4.21), which averages \$393 million per annum during the operational period, is offset by other current account elements such as debt servicing (interest payments) and dividend payments to the equity investors. In nominal terms the effect of the RMP on the current account balance, particularly large during the early years of the project, should still be wholly positive even after deducting these various additional charges. Figure 4.22 traces the effects on the current account, over time, of the RMP and shows that, despite an initial deficit during the construction period, due to the importation of capital intensive goods and services, a surplus is immediately achieved in the first year of operation of around \$400 million and, during the first five years prior to dividends being paid overseas, averages \$479 million per annum.

Figure 4.22 shows clearly that a key element in the non-merchandise element of the current account (the income balance) will be the dividends paid to Roșia Montană shareholders. While the precise timing and size of these dividend payments is not entirely certain – this will depend on profitability outcomes and RMGC board decisions – it is assumed that, as debt is repaid and an adequate level of profitability has been reached, then dividend distributions will occur.⁸⁶ Similarly, debt servicing is expected to start in the first year of construction at \$19 million, increasing to \$73 million in Year 1 and continuing until Year 6, when the last interest payment is made of \$1.2 million.

Despite these apparently large external payments (imports, interest payments, dividends) that are witnessed in the current account, over the 16-year life of the project the large exports of gold and silver generated by the project are significantly larger than these external payments. In fact, it is estimated that the average net contribution to the current account balance over the first five years of operational life is \$479 million per annum and, over the 16-year life of the project, is around \$300 million per annum.

⁸⁶ We have assumed that funds to repay the debt principal and to pay dividends to overseas shareholders will be accumulated in an account held offshore.

Figure 4.22 The effect of the Roșia Montană Project on the current account (\$ million)

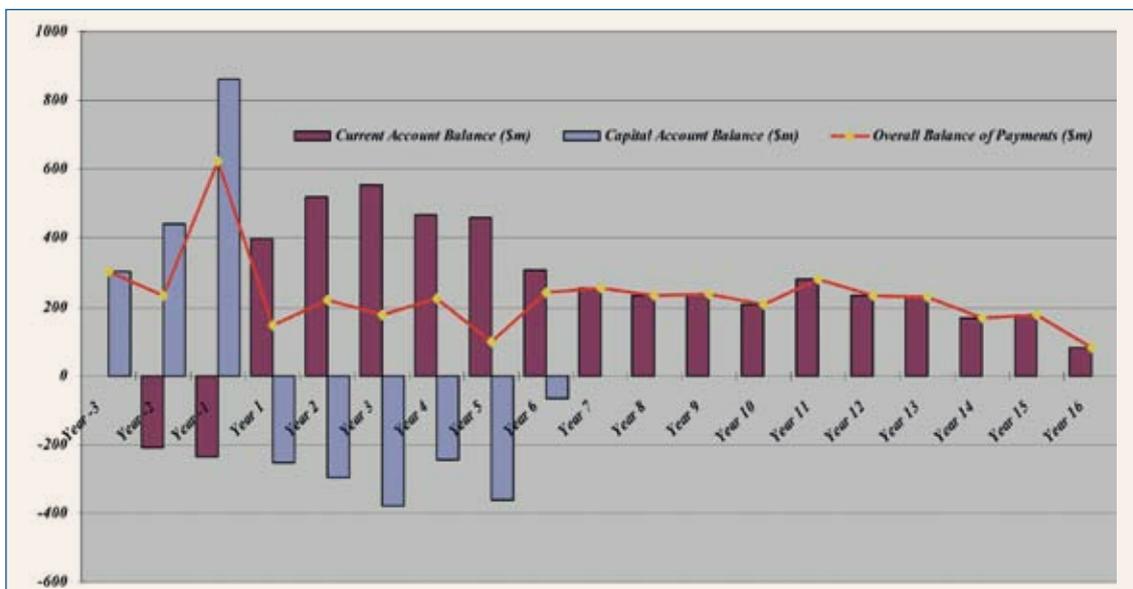


Data source: Calculated from RMP 2009.

Overall

Bringing the capital and current accounts together shows that the *net affect* on the BoP seems likely to be large and positive over the life of the project. The considerable importing of goods and services during the initial two years of construction is offset against inflows of debt that total around \$1,300 million during the same period. Overseas payments to repay debt (principal and debt servicing) and dividends only marginally reduce the large net inflows of foreign exchange coming from the export of gold and silver that start from Year 1. This picture is summarised in Figure 4.23 and shows that the project makes a positive contribution to the BoP in every year. Over the mine life it is estimated this will total over \$4 billion (undiscounted).

Figure 4.23 The effect of the Roșia Montană Project on the overall balance of payments (\$ million)



Data source: Calculated from RMP 2009.

4.8 Will the real exchange rate appreciate?

It is a common element in discussions about large investments in oil, gas and mineral investments that there is some danger that these may induce an appreciation of the host country's real exchange rate. To the extent that this occurs, it can damage the competitiveness in world markets of the other tradable products of that economy. Romania is a relatively mature industrial and diversified economy, and so could be expected to absorb a mid-sized project such as Roșia Montană with few risks of currency overvaluation. But the coming-on-stream of the RMGC project – and, potentially, other new mineral projects that might follow behind Roșia Montană – will somewhat increase the country's rate of dependency on natural resource exports, at least in the short term. For this reason, this report has examined the possibility of a real exchange rate appreciation and a discussion is included in Annex C.

Results from recent IMF analysis indicated that Romania has been proceeding relatively well in its convergence to EU conditions. Improved productivity has enabled the country's export industries to exist with a somewhat higher value for the real exchange rate. All the evidence from the past decade is that Romania has been gaining market share in its key markets in both the transition economies of the former Soviet Union and central Europe and, more importantly, in the European Union.

Our own results indicate that, at the national level, the scale of expenditures on the RMP will be far too small to engender any major deviation from these tendencies. This applies during the construction phase of the project but even more so during the longer operational phase. Indeed, if the RMP can begin the construction phase in 2011, as we have assumed in this report, then this could provide a welcome part of the macroeconomic recovery for the economy. Any anxieties about the project causing a significant real exchange rate appreciation at such a time would be misplaced.

However, at the local level there is some risk of a localised upward pressure on the prices of some non-tradable products such as housing, and this may have some small adverse effects on the relative profitability of some of the area's internationally traded sectors. This is especially the case during the construction phase of the project. *Local* demands for labour and procured goods and services, estimated at around \$73 million during construction and \$50 million during operations, will confront a local supply (both of labour and of goods and services) that is necessarily limited. So, *there is some likelihood of a local inflationary affect, especially during the construction period when the demands are large and the supply responses may be a bit slower to appear.* As was noted earlier, this will need to be managed carefully, both by the RMP and by the various local and regional authorities, who have some responsibility for labour market management and the provision of supporting infrastructure, such as housing and water supply.

Overall there seems little likelihood of a significant national impact on the real effective exchange rate.

4.9 Community contributions and social benefits of new infrastructure

In addition to taxes paid at the local level, it is anticipated there will also be a range of environmental, infrastructure and community development programmes initiated as part of the project. It is estimated the cost of these programmes will total around \$280 million and will be spent over the life of the mine. The community development programmes will explicitly focus on the economic and social development of the affected areas. The University of Alba study refers to a micro credit initiative set up in 2006 with the aim of contributing to economic diversification and development through the provision of small loans to residents in the affected areas, including Roșia Montană, Abrud and Campeni. The project also offers business development services so as to help beneficiaries develop business plans; provide advice on registering a business; and other administrative, financial and legal matters. The effectiveness of initiatives like this in responding to the needs of the affected people requires more attention to accomplish the objective of assisting the development of local businesses, both for the supplying of the project and, more generally, as part of a sustainable development plan for the area.

While the full details of the proposed community development programmes are not yet confirmed, it is interesting to note that an unusual feature of the Romanian mining tax code means that expenditures on community services are only tax deductible if they are directly related to mining operations.⁸⁷ The examples given include local development taxes and expenses incurred for recurrent community related expenses, such as salaries for teachers and health workers. This is quite an unusual feature, as many countries recognise that an inordinate proportion of the negative effects of large investment projects impact at the community level; for this reason, through the tax system many governments actively encourage investment in community infrastructure, services and sustainable development initiatives.

In addition to the non-mine related expenditures, there are a number of direct mine-related expenditures that benefit the community at various stages during the project life. It has been estimated these amount to around \$280.3 million, much of which will immediately benefit the community. These include institutional facilities at Piatra Alba; railway sidings; county roads; and increased power, water and sewerage networks. All of these expenditures can be considered as tax deductible expenditures. Ultimately, at the end of the project's life, all of the community roads, power supply networks and reclaimed areas of land will be handed over to the communities (see Box 4.3). In terms of project expenditures that are likely to have an immediate benefit to the communities, the spending is likely to include those identified in Table 4.2.

Table 4.2 Expenditures of immediate benefit

Benefit	Expenditure (\$ million)
Legacy environmental problems mitigated by project spending	37.0
New infrastructure bequeathed to the nation:	
Institutional facilities, Piatra Alba	22.3
Institutional facilities, La Recea	9.0
Roads, water, power infrastructure, rail siding, sewerage, buildings	128.0
Community development, including social development and patrimony	84.0

87 Romanian Mining Taxation System: Competitive Position 2008, prepared by James Otto, 2nd edn, revised November 2008, p. 4.

Box 4.3 Infrastructure to be used and retained by the community and estimated valuation (\$ million)

Infrastructure:

1. County roads	20.50
2. Construction and mine roads	20.40
3. Communications network	1.30
4. Buildings	3.80
5. Sewerage treatment plant	1.00
6. Remote warehouse and rail siding	5.00
7. Diesel and gas storage/distribution	1.00
8. Fresh water supply	6.50
9. Power supply infrastructure	17.30

Socio Economic

10. Education and training services	0.50
11. Institutional relationships	4.96
12. Health, safety and wellness	1.10
13. Local business development	5.19
14. Community and social issues	3.17
15. Corporate governance monitoring and reporting	0.55
16. Cultural heritage conservation and tourism	19.68
17. Piatra Alba village (infrastructure plus public buildings) 29.20	
18. La Recea neighbourhood (infrastructure)	8.00

Other benefits

19. Water management/ARD water treatment	37.00
20. Local quarry development	6.20
21. Mitigation (earthworks during closure)	49.00
22. Re-vegetation (during closure)	13.00
23. Mine pit converted to lake	50.00

5 The economic returns from the project

5.1 Introduction

The analysis of Chapter 4 has identified and quantified a wide variety of the macroeconomic effects of the project. These individual effects are all important in their own ways and will each contribute to redressing some of the immediate economic difficulties that Romania faces in the aftermath of the global financial crisis. It is now useful to try to draw some of the constituent items together to provide a simple *numerical* assessment of the overall *economic* impact of the project. Any analysis of the *economic* impact of a project differs from financial analysis, in that it aims at identifying and comparing economic and social benefits accruing to the economy as a whole from the project. Financial analysis, however, is only concerned with revenues and expenditures recorded by the mine owners that affect the financial return to the project.

The time and resources available for the current OPM assignment did not permit an in-depth *cost–benefit analysis* with all the detailed and intricate calculations of the various shadow prices and conversion factors that are needed to perform such a task properly. Such analysis also involves some difficult and subjective assessments in quantifying the social costs and benefits of various aspects. So, in this section, we seek merely to provide orders of magnitude for the main social benefits of the project that need to be considered by decision-makers alongside the individual macro benefits that have been discussed. In relation to some of these benefits, we emphasise that the *qualitative* discussion will be as important as the narrow statistical exercise. *In short, some of the crucial elements of the project’s social contribution to local society cannot be reduced easily to mere numbers!*

5.2 Methodology

The basis for this assessment is provided by the calculations of the total cash flow and the NPV of the project (2009–2036) in purely *financial* terms as calculated in various versions of RMGC’s own financial modelling of the project. For some of those individual elements of cash flow, there is an a priori argument for suggesting that the economic benefits or costs may differ from the narrowly financial valuation of those elements.⁸⁸ To the extent that they do, the *social net benefit* of the project will diverge from the *financial benefit*. In these cases, an estimate of the true economic valuations should be substituted for the financial valuations in re-calculating the total cash flows and the associated NPV for the project for the country.

There are at least three basic difficulties in applying this methodology:

1. there is invariably considerable debate about which elements of cash flow might display divergences between the *financial* and the *social (economic)* valuations;
2. even where there is no such ambiguity, there is rarely a straightforward or uncontested way to *quantify* the magnitude of the divergence; and
3. the *social discount rate* that is needed to convert the value of accumulated cash flows to an NPV basis is a subject of some controversy.

Regarding point (1), the approach taken here is, first, to list the candidate elements of cash flow and

88 In an IFC Discussion Note on this topic, *Assessing Development Impact*, IFC, Washington DC, 20 October 1999, Dr Frank Lysy comments as follows: ‘Traditional ERR analysis has focused on adjusting the project’s private costs and benefits by adding to (or subtracting from) the private revenue streams the effects of taxes, subsidies, tariffs, and other transfers. But social benefits and costs may differ from private benefits and costs for other reasons as well. For example, the project may impose environmental costs on others (or benefits, if the new production is cleaner than what it replaced), or may increase (or reduce) congestion on surrounding roads, or may demonstrate the attractiveness of some new technology, or may provide better paying jobs to the employees than they would otherwise have, and so on. These types of impacts are the more interesting from a developmental point of view.’

then discuss these in a *qualitative* manner before proceeding to any attempted quantification of the likely magnitudes of some of these elements. Regarding point (2), the approach taken is to quantify only those elements of cash flow where there is a reasonable basis for doing so – based, at least partly, on the earlier investment of time and effort of the project teams. Professor Lysy's note for the IFC suggests that, for some quantifiable effects, the magnitude of the effect is just too small to justify the effort of detailed quantification. In quite a few cases, a reasonable (if arbitrary) conversion factor must be employed in order to arrive at a numerical magnitude. Of course, all quantified adjustments must be discounted back to an NPV basis in just the same way as the unadjusted elements of cash flow. For other effects – for example, the demonstration effects of a large project that could well stimulate beneficial follow-on investments – it will be almost impossible to defend any numerical quantification, and so it is advised merely to provide a qualitative assessment to supplement the broader quantitative calculations of the other costs and benefits.

Point (3), which relates to the choice of a social discount rate, represents the biggest challenge to an economic valuation of a large project. This is because even small increases in the chosen discount rate (e.g. a move from 11% to 12%) can cause a *large* drop in NPV, if applied to projects where the stream of benefits occurs over a long period of time. For the moment, we have used 10% as the social discount rate in reflection of the severe social problems in Roșia Montană, and Romania more generally (see Annex A), and the consequently high preference for returns in the shorter term.⁸⁹ Assuming a higher rate of discount is somewhat controversial because it implies, in effect, that the interests of later generations of people in the country are far less important than the needs of the present generation. If used for policy purposes, it could also result in the rejection (on economic grounds) of some projects that have great importance in addressing the immediate structural problems that Romania faces as it seeks convergence with other countries of the EU. In recognition of these caveats, an alternative and lower social discount rate of 5% has also been used in the calculations that follow. As it happens, the project is an attractive project in economic terms, irrespective of which of the two rates is used. But readers of this report may wish to see the differences that arise when the two alternative rates are applied.⁹⁰

5.3 The cash flow elements to adjust

These are:⁹¹

Employment and employment benefits. The project will be employing many hundreds of workers in various levels of the organisation. The wage rates (plus benefits) in a region of high unemployment will be significantly higher than the *opportunity wages* available to those workers. This reality justifies a large adjustment (downwards) of the economic costs of labour relative to the financial costs (i.e. the social costs of a unit of new employment will be less than the actual wages paid). We have used a conversion factor of 50%. The social costs of labour are set above zero in reflection of the fact that some, at least, of the local employees of the RMP will be diverted from other employment. Hence, the parameter of 50% is a composite of the lower wage rates in those existing jobs from which some of the new RMP workers are diverted and the actual *unemployed* status of the other new workers.

Training benefits. The extensive training being provided by the RMP both for its own operatives and for other related trades and professions is a cost to the company. However, the benefits to the workers who are trained are likely to exceed the costs of delivering the training. This is because the permanent gain in skills – and, so, the higher incomes that can accrue from the training – are attributes that can be used at some later

89 It is stressed that the relevant discount rate for this purpose is that which applies to the population of the country as a whole. It is well recognised that this differs from the rate of discount that might be chosen by any incumbent government. Most democratic governments have strong, but partly self-serving, reasons for choosing a high discount rate to fund what may be perceived to be 'excessive' short-term public expenditures.

90 Some people may argue that using any social discount rate contradicts the principle of 'sustainable development'; the term first coined by the Brundtland Commission, which defined it as meeting 'the needs of the present without compromising the ability of future generations to meet their own needs'.

91 An important additional adjustment in some studies of this type would be an adjustment to allow for an undervalued or overvalued exchange rate (i.e. a failure of that rate to reflect the true scarcity of foreign exchange). However, in the Romanian case the recent IMF research, as reported in this report, suggest that the current RON rate is close to its equilibrium level.

stage, both in future jobs and also in conveying indirect benefits to family members. The training element of the benefit is assumed to generate a value 60% higher than the costs incurred.

Direct and indirect taxes. All the taxes paid by the project are part of the financial cost to the company, and so they reduce total cash flow. But this is not true of the benefits to the society generally, where the taxes merely represent a transfer from the company to the government, and then to the beneficiaries of the extra public expenditures. So, all taxes paid are added back into cash flow in order to calculate the *economic* rate of return. Professor Lysy notes there may also be second and third round effects *if* the government also spends the revenues wisely and so creates benefits in terms of, for example, a healthier and better educated population. But he recommends against too much effort to quantify these. In the present difficult fiscal situation faced by Romania, it seems likely that some part, at least, of additional tax revenues may need to be used to reduce the deficit rather than boost expenditure.

Indirect employment. Section 4.6 has provided an approximate figure for the employment multipliers that may be created by the project: an average of 3.15 over the life of the mine. This will provide an additional social benefit equal to the difference between the wages paid in the indirectly created jobs and the opportunity costs of the workers involved. To estimate this, we would need to know the structure of the new job types (skill levels, and so on), as well as the wage rates that will be associated with this indirect employment. Lacking this information, it is assumed that the wage rates on average will be equal to only 60% of those paid by the RMP, but that this will still be some 20% higher than the *opportunity costs* of the labour employed – recognising, once again, that many of the persons involved would otherwise have faced long-term unemployment, and that the lags involved in developing the new indirect jobs will dilute this effect somewhat in the first two construction years of the project.

Additional profits. Insofar as the RMP is purchasing supplies from local businesses – existing or newly established – then additional turnover is created. The employment and wages associated with this activity form part of the additional benefits created by the project (see previous item) but so, too, is the extra profit generated by those businesses. We have no solid basis for quantifying this element. However, a token figure equal to 6% of the domestic purchases of goods and services by the project is added to reflect a broad order of magnitude. We have estimated the total domestic spending by the project (net of labour and of taxes paid) from the I-O calculations used in the multiplier analysis described earlier.

Environmental externalities. The negative social impact caused by the project should be added to the financial costs in all cases where these impacts are *not* mitigated by project expenditure. If we define the concept of environmental externalities quite broadly, it will encompass the long list of potential environmental effects listed in the EIA. These effects embrace issues such as water pollution, land contamination, land resettlement, occupational health risks, changes in flora and fauna, disruptions to historical and cultural buildings and facilities, archaeological sites. The project's operational costs incorporate substantial amounts of spending designed to mitigate fully the negative effects as listed – and even to effect positive benefits by virtue of the clean-up and restoration of cultural assets that are not currently usable because of their deteriorated state. In this sense, the externalities have been *internalised* and there is no need to make further adjustments to reflect them in the calculation of the economic returns. However, the RMP is unusual, in that the site for the mines has already suffered major environmental damage in its long history as a mining site *before* the arrival of the RMP (the RMP has been described as '*a project to clear up a mess*'). In the light of this, the RMGC has undertaken to make good some of this legacy damage as one element of its own project. A key element will be the actions and expenditures to halt the acid rock drainage (ARD) that affects both Romania and Hungary. The benefits to society of this additional environmental mitigation can legitimately be viewed as an additional social return to the project. Quantifying these additional benefits is, of course, a difficult (and highly technical task). For the moment, we have set the benefits equally to the expenditures that the company proposes to make for these purposes.

Social benefits of new infrastructure. New infrastructural investment undertaken for the benefits of the RMP will also, in some cases, generate an additional positive externality (a 'public good' in this case) for the Romanian business community and the population at large. Examples include new access roads to the relocation sites, the modernisation of existing main and secondary roads; a kindergarten, primary school, and gymnasium in Piatra Alba; new buildings for local authorities and public services in Roșia Montană

(e.g. town hall, police department, post office, community centre, medical clinic, marketplace); new water, power, and sanitation facilities; and new green spaces and churches. But the accurate quantification of these benefits would require special surveys of actual and likely future use by local businesses and individuals. We suggest that this be considered as a subject for future on-the-ground analysis. For the moment, we have included only the *handover values* at cost of these facilities in the calculations.⁹²

Community development programmes. The expenditures on such programmes clearly represent a financial cost to the project but a benefit to the communities. Further, if properly carried out, the community projects associated with the RMP can have a value greater than the amount they cost to deliver. This is partly because of *network externalities* whereby a stronger and better resourced community will be able to attract new activities that would not be possible in the absence of the community programmes. We understand that the company could channel many of its expenditures for these programmes through a new Roșia Montană Foundation. Clearly, the precise value of the benefits to the local areas will depend on the organisational quality and performance of this new foundation.

5.4 Results

Financial rates of return

The starting point for incorporating the various 'economic' adjustments as listed is the calculation of the financial rate of return as generated from the RMP financial model. This is summarised in real terms in Table 5.1.

92 The NPVs that emerge from the hand-over of key infrastructure are obviously dependent of the date when this occurs (possibly linked to mine closure). Obviously, the later the handover, the smaller are the NPVs. A similar point relates to the social costs of mine closure.

Table 5.1 Financial rates of return: constant prices (\$ million)

	Life of mine totals	Summary statistics
Gold revenue	7,122.5	
Silver revenue	358.4	
Total revenue	7,480.9	
Operating expenses	–	
Mining	618.1	
Processing	1,768.1	
G & A	289.5	
Refining, treatment and transportation	25.8	
Total operating costs	2,701.5	
Earnings before interest, tax, and depreciation	4,779.4	
less Depreciation	1,703.6	
Operating earnings	3,075.8	
Less		
Royalty payments	299.2	
Interest expenses	320.4	
Reclamation accrual plus environmental rehabilitation grant	135.1	
Income before taxes	2,321.1	
less Income tax	386.3	
Income after tax	1,934.8	
Adjustments to cash flow basis		
Net (after tax) income plus depreciation	3,638.3	
Reclamation accrual	127.6	
Deferred taxes	11.9	
Capital expenditures	(1,531)	
Net cash flow	2,246.6	
NPV (at 10 % financial cost of capital)		562.9
NPV (at 15 % financial cost of capital)		242.1
IFRR (internal financial rate of return)		22.5%

Note: Numbers in brackets are negative numbers.

Two points of clarification should be noted. First, the total capital expenditures for the project include the various sunk costs of the project that pre-date the 'capital to completion' investments that have mainly figured in our macro calculations. Second, the methodology used by the financial modelling team at RMGC has not involved an explicit figure for the financial costs of capital (debt and equity). Hence, the 10% and 15% figures used in Table 5.1 are merely alternative 'test' rates that correspond to the assumed financial cost of capital of this and other similar projects. It can be seen that, if the lower (and, given current conditions in the capital markets, probably more realistic) rate of 10% is used to discount the cash flows of the project to an NPV basis, then the valuation achieved is \$563 million over the life of the project to about 2036. The figure falls to \$242 million if a demanding 15% discount rate is used. This can be compared with the total un-discounted cash flows of \$2,247 million. The implied internal rate of return (IFRR) is 22.5%, which clearly indicates the potential of this project to generate a shareholder return that greatly exceeds the assumed

costs of capital. Or, to put it another way, there is a generous margin between even the aggressive 15% cost of capital and 22.5% with which to absorb the large political and commercial risks of this project, or to pay political risk insurance premiums to hedge some of those risks.

Adjusting valuations

The first category of the 'economic' adjustments to the financial cash flows is made to take account of:

- the divergences between the financial and economic valuations of the direct local labour used in the project (as discussed above);
- the tax payments associated with the project;
- the social benefits of both the training and the additional indirect employment created by the project (measured as described above); and
- the additional profits in the businesses supplying the project.

These adjustments are referred to in the upper part of Table 5.2 as the 'A' adjustments. They relate to the re-valuations of particular costs or to the indirect benefits that are inherent in the mining operation itself.

The second category of adjustments relates to the benefits that derive from the expenditures of the company that are supportive of the overall project but less directly central to the mining operation *per se*. These include the provision of supporting infrastructure, the environmental expenditures, and the community contributions of various types. These are shown in the second part of Table 5.2 and are referred to as the 'B' adjustments. At the base of Table 5.2, we show the summation of the two types of adjustments. Finally, the last line adds the financial benefits of the project (re-evaluated at the 10% discount rate, as discussed earlier) to the two categories of adjustment to give a figure for the total economic and social return from the project in NPV terms.

Table 5.2 Adjusted cash flows: constant prices (\$ million)

		Amounts	NPVs at 10%	NPVs at 5%
Net cash flow (as above)		2,246.6	562.9	
Adjustments				
	Life of mine amounts (undiscounted)			
A. Revaluations and indirect benefits				
Labour cost – over-valuation ¹	147.5		70.2	97.0
Taxes paid by project	1,717.0		719.2	1,075.0
Training benefits	3.2		1.6	2.2
Benefits of indirect jobs created	112.0		45.5	67.6
Additional profits in supplying businesses	117.4		57.2	78.7
Adjustments(A)		2,097.1	893.7	1,320.7
B. Environment, infrastructure and community benefits				
Negative externalities caused by, but also mitigated by, project	0 (neutral impact)		0	0
Plus: Legacy environmental problems mitigated by project spending	37.0		32.1	34.4
New Infrastructure bequeathed to the nation				
- Institutional facilities Piatra Alba	22.3		16.8	19.3
- Institutional facilities La Recea	9.0		8.2	8.6
- Roads, water, power infrastructure, rail siding, sewerage, buildings	128.0		33.2	60.2
Community Development including Social Development and Patrimony	67.6		31.8	44.7
Public consultation and development programmes and social programmes	16.4		7.6	10.7
Adjustments (B)		280.3	129.6	177.9
TOTAL adjustments(A + B)		2,377.4	1,023.3	1,498.6
Cash flow in economic terms		4,624.0	1,586.2	

Note: (1) This calculation does not include the payroll taxes on wages and salaries as paid by the project, as it is included in the total taxes paid in the next line of the table.

It is apparent from Table 5.2 there are two particularly significant 'economic' adjustments. The first arises from the fact that the *taxes and related fiscal charges* incurred by the project are only transfers within the country, and so they do not reduce cash flows (to society) in the manner that they do for the purposes of the financial rate of return calculations. Making the adjustment for this adds at least \$719 million to the *discounted* net cash flows over the life of the project at 10%, and, if discounted at 5%, \$1075 million – thereby more than doubling the financial cash flow in narrow financial terms (if evaluated at the 10% discount rate).

The second major adjustment arises from the job creation of the project in an Alba County environment of high unemployment combined with relatively low wages in alternative jobs. The precise magnitude here obviously depends on our assumption of a 50% conversion factor. But that is likely to be a conservative figure, if anything, given the serious unemployment in the project region – hence, the large effect here is a sound result even if the precise number shown in Table 5.2 is hard to defend. In NPV terms, if discounted at 10% this adjustment is \$70.2 million and, at 5%, \$97 million.

In addition, the results suggest that the *indirect jobs and profits* created through multiplier effects could add a further sum totalling around \$103 million in discounted social benefits at 10% (\$146 million at 5%) to the local and national economy. It is noted that the multipliers on which this result depends are likely to be lagged in their effects on the economy, and affected in magnitude by the quality of the policies and programmes for small business development that the company and the local and national authorities can jointly deliver. Hence, the numbers for these items should be regarded as an indication of a *potential* to be realised rather than as firm projections of what will actually happen.

Turning to the category B adjustments, we note that there is a significant social benefit to the economy from RMGC's proposed clean up of the *legacy of environmental problems* of the area: a discounted total at 10% of \$32 million, and \$34 million at 5%. This valuation is based on the cost to the company of that clean-up. In reality, the full benefits could be larger in terms of the environmental gains that can accrue from diminished levels of ARD and other harmful pollutants from the historical mining activities, and improvements to the social and physical environment from the rehabilitation of pits (comprising the refilling of three and the conversion of the fourth into a lake).

The *new infrastructure benefits* shown in Table 5.2 are similarly important and significant in NPV terms, adding a further sum totalling around \$58 million when the 10% discount rate is used and \$88 million when the 5% discount rate is used (this is entitled 'New Infrastructure bequeathed to the nation'). It is noted that the public buildings and other infrastructure being provided (for example, in Piatra Alba at a cost of \$22.3 million) come early in the project. Therefore, the effect of the discounting procedure is to leave these benefits relatively large, even in discounted terms. However, some of the infrastructure that is listed is for the dedicated use of the RMGC; that will be handed over to the nation only near the closure of the mine, resulting in a significantly reduced *discounted* amount because of the long wait for the social benefits to emerge. But other parts of the infrastructure that listed in Table 5.2 (e.g. county roads and some of the water supply and remote warehousing facilities) will be available for community use much earlier in the project's life cycle, and so will convey a much greater social value in discounted terms.⁹³

Finally, the wide range of community and social programmes and benefits, including the monies to be channelled via the new foundation, add around \$39.4 million more to the overall discounted social benefits of the project when calculated at 10% (\$55.4 million at 5%). For the moment, this estimate has made no attempt to include any additional benefits to the local communities that could arise from network externalities as discussed earlier (e.g. from the development of patrimonial assets, possible tourism, and better historical data; and the improvement of environmental/health conditions).

In total, the overall economic and social benefits of the project (including the financial net cash flow discounted at 10%) are estimated to amount to some \$1,586.2 million, if the discounted financial return of 10% is factored as shown by the final line 'Cash flow in economic terms'. If only the two categories

93 We were provided with detailed data on this point and have used these to the greatest extent possible in the calculations that are reported.

of adjustment (A and B) shown in Table 5.2 are totalled using discount rates of 10% and 5%, they equal \$1023.3 million and \$1498.6 million, respectively.

5.5 Interpreting the returns to the domestic economy

In addition to the standard types of cost–benefit approach described, it is useful to consider in parallel a somewhat more narrow approach. This is referred to as the *return to the domestic economy* (RDE). As the name suggests, this second method abstracts fully from the costs and benefits, which are narrowly confined to the foreign participants in the project (e.g. those stakeholders who provide debt financing and equity funds for the project but are fully repaid in terms of interest, dividends and capital repayments, over time). As with the first method, the costs and benefits that are factored in to calculate the RDE are valued at their economic prices rather than their market prices. However, since all the capital financing for the RMP is coming from international equity and debt contributions, there is no explicit capital cost to include in the parallel RDE calculations.

It is relatively easy to interpret our earlier results in terms of the RDE approach. All that is required is to sum together the discounted values of the following components:

- all the tax revenues received by government at state, regional and local levels;
- the labour benefits – these comprise the surplus of the actual wage paid to direct labour over the shadow wage rate; the same for indirect labour; and any subsidiary benefits of employment including training;
- local supplier benefits – these are the benefits to local firms supplying the RMP in terms of the additional profits that these firms realise;
- the infrastructure built by and for the RMP, but which also provides some broader services to the economy either by being handed to government at the end of the project's life or by conveying broader economic benefits during the project's life;
- the net environmental benefits created by the project (i.e. environmental spending in excess of the amounts needed to clean up any damage caused by the RMP itself); and
- the local community benefits of the project.

As we can see from the component items in Table 5.2, these component items are, in fact, the A and B adjustments as listed. So, the total adjustment of **\$1,023.3 million** (as in Table 5.2) can be interpreted as the RDE (the returns the project will be generating for the domestic economy).⁹⁴ These returns to the domestic economy rise to \$1,498.6 million, if a 5% discount rate is employed.

The analysis has evaluated both the *financial* returns to the project and the *economic/social* returns at a 10% rate of discount. It is therefore legitimate to juxtapose the results of these two calculations to make some final comments about the relative benefits that seem likely to be obtained by the Romanian domestic economy and also the shareholders in the company. That comparison indicates that the returns to the domestic economy at \$1,023.3 million in NPV terms, using a discount rate of 10%, will exceed the *financial* return to the project of \$563 million by around 80%. A comparison of the financial NPV at the 15% discount rate with the economic rate of return at the 5% rate of discount does, of course, indicate a much larger advantage to the economic returns. In this scenario, the returns to the Romanian domestic economy are more than six times greater (\$1,498.6 million as in Table 5.2, as compared with \$242 million in Table 5.1 for the narrow financial return).

⁹⁴ It is noted that this total return does not involve the economy in any costs in acquiring the benefit: all the capital costs of the project are ascribed to the foreign participants, and so are excluded in the RDE calculation. For the same reason, there is no possibility of calculating an internal rate of return that corresponds to the RDE: to do this we would need to assign some costs to the domestic economy.

Of course, it would be wrong to make too much of the apparent precision of such numbers, given the numerous assumptions underlying the calculations. We repeat: we have *not* undertaken an in-depth economic rate of return exercise. However, the orders of magnitude do justify the conclusion that there is, indeed, likely to be a large share of the overall benefits of the project for the Romanian community in addition to a strong financial return to the local and foreign equity stakeholders.⁹⁵

5.6 Summary

The application of some basic economic adjustments to the components of *financial* cash flow, indicate that the undiscounted economic benefits of the project to the country could exceed the purely financial returns by a substantial amount. That conclusion is, of course, subject to the methodology used and to the primitive nature of a number of the quantifications that have been employed. It is also coloured by the absence of detailed quantification on some of the externalities that may be regarded as important (e.g. any environmental externalities that are not internalised). However, the three steps involved in the calculation of the economic valuation of the project provide broad orders of magnitude that can help to guide decisions by indicating which factors are quantitatively important and which of them are somewhat less important.

The central conclusion is that the RMP is a substantial investment that can also generate a significant economic and social return to the Romanian society. A subsidiary but important conclusion is that some, at least, of the indirect effects are contingent as to their magnitudes on sound policies and programmes. So, it will be important in seeking to maximise those returns that everything possible is done to develop the downstream and other indirect benefits that the RMGC investment and its supporting social and community programme will be bringing to the country.

A final proposition is that the purely financial returns of the project (as indicated in Table 5.1) will arguably be fully expropriated by the project sponsors (i.e. RMGC and its debt-providing partners). So, this element of the net cash flow might arguably be disregarded in assessing the net benefits to the country. If this point were to be accepted, then it is only the A and B adjustments of our calculations that need to be considered in assessing the country's attitude to the project. Fortunately, as we have shown, the net cash flows under these headings add up to a dollar total that is, itself, large in absolute dollar terms, even when the more conservative of the two discount rates is used.

95 This comparison should not be confused with comparisons that look more narrowly at the manner in which the fiscal revenues of the project compare with shareholders returns.

6 Conclusions and main results

The RMP is a large project, by any standards. The investment capital required to complete the project would be some \$1,600 million, which increases to over \$2 billion when the costs of sustaining capital and closure capital accruing in future years are included. Although, in recent years, Romania has achieved considerable success in attracting new FDI, such success is currently deflated by the deep recession that has afflicted the country as a consequence of the global financial crisis. In that new context, the investment in Roșia Montană has a macroeconomic significance that is more substantial than was originally anticipated. Furthermore, since the project imposes no new debt obligations on the country, the challenging macro problems caused by the current recession do not represent a reason for delaying the project: indeed, the project can be a part of the resolution of those problems.

This report provides an assessment of the impact of this large project from a narrow *macroeconomic* point of view. It thereby contributes one of the assessment elements for the project that has not previously been available. The assessment is provided mainly for the two-year *construction* phase and the longer *operational* phase of 16 years. However, including also the closure period, it covers a total period of some 27 years.

It is important to emphasise that the scope and ambition of this report is limited in two main ways. First, it relies on data generated by the working assumptions of the project's own cash flow model: specifically the March 2009 Canadian National Instrument 43-101 Technical Report on the RMP. These assumptions will be subject to change as the detailed final stage work on designing the financing structure for the project (delayed by the cessation of work on the EIA in 2007) evolves. We have used only one of the scenarios of that model and, although this reflects the most up-to-date information available, other variants on that scenario are possible (e.g. one involving a lower world price for gold). Hence, our own results should not be interpreted in any sense as *firm forecasts* of what might happen but, rather, merely as a description of an indicative scenario.

Second, the report does not address the critical local *microeconomic and social impact* in the localities that are in the directly and indirectly impacted areas of the mine workings. It is recognised explicitly that these issues are extremely important and will be critical in ensuring the maximum benefits possible from the project are realised. In terms of context, it is estimated that around 17.2% of the population lives on less than \$2 per day, and it is expected this figure could worsen in 2009 as an even smaller proportion of those unemployed will receive financial aid as benefits paid to ex-miners finally come to an end. These microeconomic and social impact issues certainly do need to be factored in as a part of the overall assessment of the project. However, that work will be carried out separately in order to supplement the overall assessment.

Results on direct macroeconomic impacts

Section 4 of this report provides results that conform to a broad structure that has been seen in a number of other countries that have significant mining investment. This includes a pattern of the headline macro numbers (such as FDI, exports, taxes and dividends) accruing at the national level while, because of the high capital intensity of modern mining, relatively few jobs are created at the local level. It is admittedly the case that this pattern is far more pronounced in lower-income agrarian economies than in a richer middle-income and industrialised economy such as Romania. In 2008, Romania had a total GDP of some \$202.74 billion, so even the large investment to completion of Roșia Montană is only the equivalent of 0.7% of Romania's annual production. When we relate the specific macro impacts of the project to the relevant macro aggregates, the magnitude of the effects are generally larger at the national level. However, some effects (employment) are also significant at the local level.

In brief:

Foreign direct investment. The investment capital required to complete the project is anticipated to be

some \$1,600 million, comprising annual inflows into the Romanian economy in the first and second years of construction of \$440 million and \$860 million, respectively. In addition, in order to keep the mine in operation during its 16-year life, further investments in sustaining capital and closure capital take the total investment to over \$2 billion, when the costs in future years are included. The capital investment to completion is the equivalent of about **12%** of the total FDI that entered Romania in 2008.

Balance of payments. The BoP have several elements in addition to the large FDI component. In the early years of the project, this component more than covers the cost of the large surge of imports of equipment needed in those years. After that, the next most important component is the annual flow of new *export earnings*, which will peak at around \$666.9 million (in 2008 prices) and deliver annual average foreign exchange earnings of some \$467.5 million over the 16 operational years of the project. These sums represent **1.3% and 0.9%**, respectively, of the total export earnings of all goods from Romania from all sectors in 2008. Although these earnings are offset by increased imports, there will nonetheless be an export surplus from the project in all years after the two construction years. During the operational period, the export surplus will average \$393 million per annum. In time, the payment of interest and dividends will reduce the foreign exchange coming from this large trade surplus, which falls from an average of \$479 million per annum during the first five years of the operational period to average around \$300 million per annum over the 16-year operational life of the project. This contribution can be compared with Romania's large current account deficit of more than \$25.2 billion in 2008. The annual foreign exchange earnings from the project will contribute over its 16-year operational life the equivalent of around 1.2% of that present deficit, and 1.9% per annum during the first five years of operation.

Government revenue. During the project's life, it will be paying directly to government (both national and local) a wide variety of taxes, charges and dividends. Specifically, a total of \$1.72 billion will be paid to government in both taxes and dividend payments over the full life of the project. In NPV terms, if this sum is discounted at 10% it will equal \$719 million, and \$1,075 million if discounted at 5%. During the first 10 years of the project's operational life, an average of \$103 million is paid in taxes and dividends. The largest payments are in the form of social security payments, royalties, the withholding tax, income tax and, in time, significant payments from dividends on the government's equity share of the project. The peak year for such tax and dividend payments is Year 11. In that peak year, a total of \$166 million is paid by RMGC, of which \$112 million is in taxes and \$54 million is a single dividend payment to a state-owned company. The tax-take alone varies in amount between 0.1% and 0.2% of the government's likely tax revenues and, with the addition of dividends (starting in Year 6), pushes this to 0.25% of the total revenues of the government in Year 11. So, while the sums involved are large in *absolute* terms, they cannot be considered overwhelmingly large when compared with the government's relatively broad overall tax capacity. A better indication of the project's significance in this regard is generated by considering the country's presently severe fiscal deficits. In the first year of project operation (assumed to be 2013), the total taxes paid by the project of \$63.6 million are the equivalent of **1.7%** of the anticipated gross financing need of the government, increasing to 2.2% by Year 3 (see Figure 4.10). So, in this and the other early years, the project could be crucial in creating fiscal space to help to accommodate some of the social and other economic difficulties now facing the country (such as the anticipated pension deficit in 2011 of 2% of GDP).

GDP and GNI. A major *direct* GDP (and GNI) effect will come immediately with the start of the project from the significant proportion of goods and services bought in Romania. A proportion of this spending will create value-added as measured for GDP (and GNI) in the form of local wages and profits in the supplying firms. In addition, a further contribution to GDP (and GNI) will be the profit or income that is generated by the activities of the mine calculated before the deduction of either interest payments, dividends or tax payments to government. A third contribution to GDP (and GNI) will come from the significant proportion of labour employed during the 18-year project life. Ultimately, the project's typical *direct* annual contribution to GDP and GNI has been estimated at between 0.1% and 0.3% of the total. These are not large *annual* numbers but, since they are sustained over a long period, their cumulative effect on GDP of around 3% is indeed, significant. We have estimated that over the life of the mine this would be the equivalent of around \$6 billion. Also, in terms of growth, an uplift of this order is numerically important. The GNI numbers in absolute terms will be somewhat smaller because of the outflows, over time, of interest, dividends and expatriate wage payments (see Figure 4.1). The multiplier effects on the direct project contributions are likely to increase these sums by a greater amount (estimated at around 0.51% of GDP in a typical project

year – three times the direct contribution of 0.17%). The largest contributions to GDP arise early in the operational period, when it is most needed by the country; and, in Year 3, the effect of the multiplier increases the estimated 0.28% direct contribution by three times to 0.84% of GDP. Over the life of the mine we have estimated GDP could be 9% higher with the project than without it. This would be the equivalent of around \$19 billion.

Employment. During the initial two-year *construction phase* from 2011, the estimated Romanian labour demands of the project reach their peak. At that stage, 2,391 workers in total are estimated to be required, of which 2,337 will be Romanian workers who will be either employed directly or employed by contractors on work for which jobs are directly measurable by the company (e.g. earth-moving and transportation), but excluding jobs with suppliers of equipment and materials. This period of intense construction and mine activity will generate a wage bill in excess of \$63 million per annum, much of which will be spent locally on various household and consumer-related goods and services. In the operational years of the project, the numbers directly engaged will be some 881 Romanian workers, generating a wages bill (on average) of around \$22 million per annum. The engagement of large numbers of foreign staff is not anticipated even during the two-year construction phase, when there will only be an estimated 54 expatriate workers. The total project demand for labour represents only a small proportion of Romania's total labour force but is large compared with the numbers of potential workers in the immediate areas of the project. For the moment, the project team is estimating the numbers of workers to be engaged *from other parts* of the country will total more than 590. Although the 590 jobs identified as national (rather than local and regional) are expected to be recruited from outside the area, the work itself will largely be in the immediate vicinity of the mine. This will still leave over 1,745 new jobs to be filled by persons from the *local and regional* areas of Roșia Montană. However, this new labour demand must be viewed against the total populations of the immediate communities affected by the mine of only about 18,000 persons, with the active labour force likely to be only around 3,000 to 4,000 persons. So, the labour demands of the project in the short term seem certain to spill over to require some inward migration, either from the broader region or from the national labour pool more generally. There are potential social and other consequences of this – not least because of its temporary nature, especially during construction – that will need to be recognised and managed well.

Results from the multiplier analysis

The estimates of the direct project impacts described in Section 4 have been augmented by in-depth calculations of the likely indirect and induced effects of the project. These effects are generated by the second and subsequent rounds of spending, both of supplying firms and the initial recipients of enhanced wage and salary incomes. The multipliers that have been calculated have used a very detailed 55 sector I-O matrix for Romania for the latest available year (2006). This has been assumed to provide coefficients that remain broadly constant through the project life.

The results are largely what one would expect for a relatively industrialised and diversified economy such as that of Romania. The domestic economy has the capacity to supply a wide range of the goods and services that are likely to be required by the project – even some of the more sophisticated equipment and chemicals, for example. This means that the second and subsequent rounds of spending are also relatively large, and that the multipliers that are calculated as the convergence of the various spending rounds are all sizeable.

The results, in brief, are as follows:

- **Gross output multipliers.** These have estimated values of around **3.5 during the construction phase and 3.0 during the longer operational period.** It is prudent to somewhat discount the values of the earlier years, on the grounds that there will be some inevitable lags while local industries gear themselves up to provide outputs at a significantly higher level than in the immediate past. It is noted, in particular, that mining has been in significant decline in Romania and that some of the key supplying firms will have closed, or at the least scaled back their capacities. However, even allowing for this, we can expect to see a total *longer-term* output impact on Romanian industry that is several times greater than that created directly by the RMP. Even conservative numbers would set these multiplier effects

on output in the range of 2.5 to 2.75. A wide range of Romanian industry will be impacted. In the construction phase, the main beneficiary industries are equipment supply and construction. In the operational phase, the main beneficiary sectors are power, construction, food and agriculture. However, many other sectors receive a boost to their output in excess of \$5 million per annum (see Table 4.1).

- **Household Income multipliers.** These are estimated to be somewhat higher than the output multipliers, with values over the life of the project being typically around **4.0 (construction period) to 4.75**.
- **Employment multipliers.** These are estimated to be in the region of **4.0 to 4.5**. The indirect employment numbers in some of the 16 operational years are estimated to be in excess of 3,000 persons, as against the direct employment numbers of approximately 800 persons. The multiplier analysis is national in scope, and so does not tell us how many of these indirect jobs might be expected to be in the local areas impacted by the mine. Further, these relatively high numbers depend on the achievement of the expansions of the main supplying sectors as listed in Table 4.1. Appropriate facilitating supports from policies and the programmes of government will be needed to achieve some of the large employment gains.
- **Government revenue multipliers.** These are likely to increase the direct revenue contribution of the RMP by around **2.5 to 2.75 times**, as firms benefiting from increased production to supply the mine spend their additional incomes on other goods and services that are themselves taxed (these are the indirect effects). In addition to the inter-industry effects, the boost to the wider economy comes from increased income and consumption at the household level (these are the induced effects). Therefore, the overall impact of direct, indirect and induced effects from the project on government revenues might be as high as **4.0 times** the revenue contribution of the RMP.
- **Government re-spending multipliers.** In some studies of this type, the revenue of government from a mining project is assumed to be fully or partly spent, thereby creating second and subsequent rounds of incomes and further spending. Given the seriously impaired state of Romania's public finances, we have assumed very conservatively that the priority will be to use any additional revenues for the purposes of deficit reduction, rather than to boost expenditures. This is a strong and more limiting assumption, but realistic for the short term in the present circumstances. However, insofar as it is unrealistic for the later project years, then we are under-stating the indirect effects of the project as there would be government re-spending multipliers. In theory, this could be of a similar magnitude to the private sector, if spent in the same manner – thus providing a further increase to economic activity and, thereby, taxes and employment within Romania.

The economic returns from the project

These individual macro effects – direct and indirect – are all important in their own ways, and will all contribute to redressing some of the immediate economic difficulties that Romania faces in the aftermath of the global financial crisis. The *economic return* calculations draw the main constituent items together to provide a simple *numerical* assessment of the overall economic impact of the project. The results as presented in Section 5 indicate the following:

- the narrow financial returns from the project are significant. Based on the financial modelling that has been carried out, the likely NPV on a cash flow basis, assuming a financial cost of capital rate of 10%, will be about \$563 million and, at 15%, will be \$242 million. This implies an internal financial rate of return (IFRR) of 22.5%, which clearly provides for a generous margin (over the assumed cost of capital) with which to absorb the large political and commercial risks of this project.
- the economic adjustments to some of the main benefits and costs of the project indicate there will also be large returns to the domestic economy, in addition to those accruing to the shareholders. The most substantial of these are the \$1.72 billion paid in **taxes and other government revenues** that will accrue wholly to the nation and so need not be treated as a reduction of cash flow, as they are in calculating the IFRR. Even using a relatively high social discount rate of 10%, this benefit has a value to the economy in NPV terms of \$719 million and, in using a lower discount rate of 5%, is \$1,075 million.
- the next most significant component of the domestic returns to the domestic economy is that associated with the **employment of otherwise unemployed or underemployed labour**. We estimate this benefit as having an NPV at 10% of \$70.2 million (the direct employment benefit) and a further

\$45.5 million (from the indirectly created new employment) – a total of approximately \$115.7 million (using a discount rate of 5% increases this total to around \$164.6 million). In addition, there will be an estimated gain to the domestic economy from the training programmes that the project will initiate.

- in addition, an estimated benefit of \$57.2 million in NPV terms at 10% can be expected from the **additional incomes** (e.g. profits) in those firms that expand as an indirect result of the project's own direct spending and the indirect spending generated in the multiplier process (this equates to \$78.7 million when discounted at 5%).
- finally, there will be large net gains from the various **environmental, infrastructure and community expenditure** of the project. These have been estimated on a conservative basis merely by trying to assess the social benefits of the proposed expenditures of the company. To be conservative, once again, these benefits are valued only at the costs to the company of their implementation. Nonetheless, they yield a contribution to total RDE of more than **\$129.6 million** in NPV terms when discounted at 10%, and \$177.9 million when discounted at 5%. Some of the prospective benefits (such as that associated with the ARD programme) could be larger than the expenditures alone might indicate. It is also emphasised that a zero social benefit is attached to those expenditures that are incurred merely to mitigate and rehabilitate environmental disturbances that the project itself is acknowledged to create.
- overall, it is estimated that the total RDE in NPV terms, and using a social discount rate of 10%, will amount to around **\$1,023.3 million (\$1,498.6 million when using a 5% social discount rate)**.
- we cannot compute an IRR equivalent for these benefits to the domestic economy since there is no capital cost incurred by the nation to acquire the project. However, we can note that the NPV of these benefits at over \$1 billion are substantial and ensure that the nation is able to appropriate a *high absolute value* from the conduct of the project. Further work would be needed to assess whether the relative shares of shareholders and the nation are in any sense correct or fair, even assuming that there is an unambiguous answer to such a question.

Other results

A number of side issues have emerged in the conduct of this study. The two most important are:

The real exchange rate. In parallel with our calculations of the BoP effects of the project, we have sought to assess whether the Romanian real exchange rate might become overvalued as a consequence of the project. The conclusion is that this is highly unlikely. In most years, the total volumes of project spend at the national level are not large enough to cause a radical shift in the balance of prices in favour of non-traded goods. Only when there are large dividend payments to government might this situation need to be watched a little more carefully. Overall, there seems little likelihood of a significant national impact on the real effective exchange rate. However, we would warn of a likely *local effect* on non-traded goods prices (such as real estate and labour) because of the large demands (relative to supplies) of housing and some services, particularly during the construction phase and especially if significant numbers of non-local workers need to be brought into the area.

Local tax revenues. It is noted that the local share in the total taxes and charges to be paid by the project are extremely small, in both absolute and relative terms (see Figure 4.6). If, as we recommend, local and regional governments are to play an active part in providing complementary support services to the project (e.g. some infrastructure and support services to small businesses), then consideration needs to be given regarding possible improvement to revenue-sharing arrangements, as between state and local governments. This, of course, is a big topic in its own right, and well beyond the terms of reference for this present assignment. Our purpose here is merely to flag it as prospectively very important, if the full socio-economic benefits of Roșia Montană are to be achieved.

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Annex A The socio-economic situation at national and local levels

Poverty and human development: The national situation

The assessment in the report regarding the likely local-level impact of the project needs to consider the starting point of human and social development in Romania as a whole. Some of the key national characteristics can be taken from the UNDP's *National Human Development Report for 2007*.

The available socio-economic data help to spell out the following characterization of the conditions affecting the Romanian population and labour force. This high-level data form part of the background for our later discussion on project impacts at the local level, and also serve to contextualize the potential positive impacts expected of the RMGC project, and how the socio-economic risks that could influence project outcomes may be better mitigated.

Romania's population in mid-2009 is an estimated 22.2 million persons, distributed according to a similar structure to that seen in the rest of Europe, with an age structure as follows:

- 0–4 years: 15.5% (male 1,772,583/female 1,681,539)
- 15–64 years: 69.7% (male 7,711,062/female 7,784,041)
- 65 years and over: 14.7% (male 1,332,120/female 1,934,076) (2009 est.)

The 2008 Human Development Index (HDI)⁹⁶ ranks Romania at 62 out of 179, reflecting relatively high scores across the six main indicators and, in particular, in those pertaining to life expectancy, enrolment rates and literacy rates. The index, overall, positions Romania directly below Venezuela and above Malaysia.

In terms of the main economic activities that engage the 9.32 million labour force, 29.7% work in agriculture, 23.2% in industry and 47.1% in services (2006). The latest unemployment figures for 2009 are not available; however, in general, *official* unemployment rates have fallen steadily in the recent past: from 1999 to 2005 they fell from a high of 11.8% to only 5.9%. Women's unemployment is reported to be less than the national average, at 5.2%. The data from the International Labour Office (ILO), however, do not confirm such a reduction and estimate unemployment to have remained largely static at around 7% throughout the period. Looking within the unemployment numbers shows that there are high rates of unemployment amongst young people – a staggering 30.3% (although this has fallen from a high of 44.6% in 1998).

Nearly 55% of the population live in urban areas, where there is far greater access to health and education facilities – for every physician in the urban areas, there are 283 people; in the rural area, this increases to 1,806. The effect is that life expectancy, general fertility and infant mortality rates are considerably better in urban areas. Rural areas appear to be characterised by high numbers of young people (0–14 years) and older people (65 and over), resulting in the demographic dependency rate in rural areas being nearly twice that of urban areas.⁹⁷

Significantly, national *poverty rates*, which worsened in the immediate aftermath of the break-up of the Soviet Union, have fallen more recently: by 2005, they had almost halved from the 1998 level. These significant reductions have been found for both urban and rural poverty, although there are still considerable differences between urban poverty at 9.4% and rural poverty at 23.4% in 2005. The groups of

⁹⁶ The HDI provides a composite measure of three dimensions of human development: living a long and healthy life (measured by life expectancy), being educated (measured by adult literacy and enrolment at the primary, secondary and tertiary level), and having a decent standard of living (measured by purchasing power parity, PPP, income). The index is not in any sense a comprehensive measure of human development but merely a proxy to help gauge changes over time.

⁹⁷ UNDP, National Human Development Report – Romania, 2007, table A.19.

people most acutely affected by poverty are the self-employed (in particular, those in agricultural activities), the unemployed and also the young.⁹⁸

In the *education* sector, the same Human Development Report (HDR) adduces quantitative indicators showing that, in this sector, the gross primary school enrolment rate rose from 99.8% in 1998 to the even higher rate of 106.1% in 2005. Accordingly, the literacy rate in Romania remains extremely high. According to the HDR 2007, the combined gross enrolment ratio for primary, secondary and tertiary education in 2005 stood at 72.9% (an increase from 63.9% in 1998). The most noticeable change was at the tertiary level, where gross enrolment increased from 25.4% to 47.5%.⁹⁹ Clearly, there have been major efforts to develop further the already high rates of investment in human capital achieved in the Communist period.

Romania's *health* sector has also been characterized by significant improvements in infrastructure and health facilities (which has led to significant declines in maternal and infant mortality rates) and increased numbers of medical staff per population. However, as noted, there are significant differences in access to health services and facilities between rural and urban populations.

The *situation of women* in Romania, from a purely national statistics perspective, looks largely positive. Women experience lower levels of unemployment, live longer lives and have higher rates of enrolment at all educational levels. The only quantitative indicators that deviate from this positive picture is that women tend to be employed in less skilled jobs and hold fewer managerial and official jobs in general government – and thus earn, on average, only 86% of men's average earnings in non-agricultural activities. Women also still only hold a small proportion of the seats in parliament, although this doubled to 10.5% between 1998 and 2005. The consequence of these factors is that Romania's position in the UNDP Gender Empowerment Measure is relatively low, at 80 out of 108.¹⁰⁰

Clearly, Romania has made huge advances since the bleak days of the early 1990s based on a number of socio-economic indicators. This comes through clearly in the improved HDI figures, which now rank Romania at 62 out of 179, reflecting relatively high scores across the six main indicators.

A.1 Poverty and human development: The regional and the local situations

Romania is subdivided into seven regions, each including several *judetul* (counties). Roșia Montană is located in Alba County, which is part of the central region (also including Brasov, Covasna, Harghita, Mures and Sibiu counties). In addition to national data as referenced, the UNDP's Human Development Report 2008 also provides data on Territorial Human Development Indicators. These localised data provide a good basis to locate the situation of the Roșia Montană mine area (e.g. as described in the EIA) in relation to the socio-economic situation at both the high-level *regional level* (the central area) and at the *local level* (Alba County).

There are 2,530,500 people living in the central area and, of these, around 15% (or 379,200) live in Alba County. Across almost all of the main development indicators Alba County and the central area record higher scores than the Romanian average, this is true for GDP per capita at \$8,796,¹⁰¹ life expectancy at birth, and adult population literacy rate. The only indicator where Alba and the central area score lower than the national average is in educational enrolment rates.

However, some of the worst indicators for Alba and the central area are found within the *unemployment* figures. While the proportion unemployed in the central area is high compared with the national average, it is even higher for Alba County. Some 20% of the registered unemployed in the central region live in Alba.¹⁰² The long-term unemployment found in Alba and the central area is far more pronounced than in the

98 Ibid.

99 Ibid, table A.7.

100 http://hdrstats.undp.org/countries/data_sheets/cty_ds_ROM.html

101 GDP per capita in PPP US\$ 2004, table B.1.

102 'Deprivations and Restrictive Factors in Human Development', table B.4.

nation as a whole, and is second only to the north-west in terms of the incidence of those who have been unemployed for six months or longer. This type of unemployment is far more serious and difficult to shift than, for example, the narrowly seasonal changes in employment. It hints also at deep-seated structural problems in employment at the local level where the mine is to be located.

Similarly, women's unemployment at the regional and local levels is considerably higher than the national average. Partly because unemployment is relatively high, the proportion of unemployed (men and women) able to access financial assistance is also much higher in the central area and in Alba than the national average. This is probably due to compensation received following the closure of the mines in the local areas by 2007. For most, people these unemployment benefits will end in mid-2009, thereby worsening the presently measured levels of deprivation. In terms of the direct impact on women, the disproportionate effect that mine closures typically have on them has resulted in women's unemployment at the regional and local levels being considerably higher than at the national level. In addition, studies reveal there are a number of secondary impacts that mine closure can have on women. These include increases in the incidence of domestic violence, divorce rates and the burden of child care. *Taken together, these factors may go some way to explaining the extremely high rates of suicide (men and women) in the central region – the highest in the country and nearly 40% higher than the national average – and in Alba County, where rates of suicide are almost twice those of urban areas (and higher than the rural average).*¹⁰³

In terms of the *physical dimensions of welfare*, people in Alba and the central region have greater access to electricity and water than the national average. However, one in four people within Alba are still unable to access sustainable sources of water (typical of rural areas, where limited access to water is far more pronounced than in urban areas). To put this high figure of 25% for those unable to access sustainable sources of water in context, it should be compared with that of Bucharest, where it is only 3.1%, while the national average is 28%.

Health and education indicators for the central region and Alba County do not differ that greatly from the national average, although maternal mortality rates for the central region are nearly the highest in the country; and infant mortality rates are higher in Alba than in almost any other county. In terms of a proxy for measuring the degree of isolation and, to a certain extent, the disposable income of an area (e.g. whether they can afford electricity, and so on), the number of people with televisions and radios in Alba is considerably lower than the national average. Other data sources support this finding on poverty and rural isolation, indicating that a large number of the population in the central area live in small towns of fewer than 100,000 people.

Similarly, the lower than average birth rate and falling growth rate of the population of the central region and Alba County is a telling factor in an area facing an ageing population. This largely occurs as those of working (and child-rearing) ages are leaving the area in search of improved economic opportunities in urban centres or overseas. The data suggest that those left behind are the young, some of whom are in the care of the old (and, sometimes, presumably vice-versa).

A.2 Poverty and human development: The immediate community level

There are three different administrative entities in Alba County that are of relevance to the Roșia Montană Project, they include:

- The *comuna* (rural commune) of Roșia Montană, comprising an area of approximately 42 km², includes 16 localities in total, with a combined population of 3,865 people (according to the Non-Technical Summary (ch. 10) which refers to the 2002 census). The largest village in the *comuna* is Roșia Montană;
- The *orasul* (urban commune) of Abrud is about 12 km from Roșia Montană and includes, in addition to the town of Abrud, three villages: Abrud Sat, Gura Cornei and Soharu. In total, there is a population of 6,213 inhabitants (2002 census); and

103 Poverty and Social Impact Analysis of Mining Sector Reform in Romania: A Policy Note, Report Number 32772-RO, June 2006, p. 4.

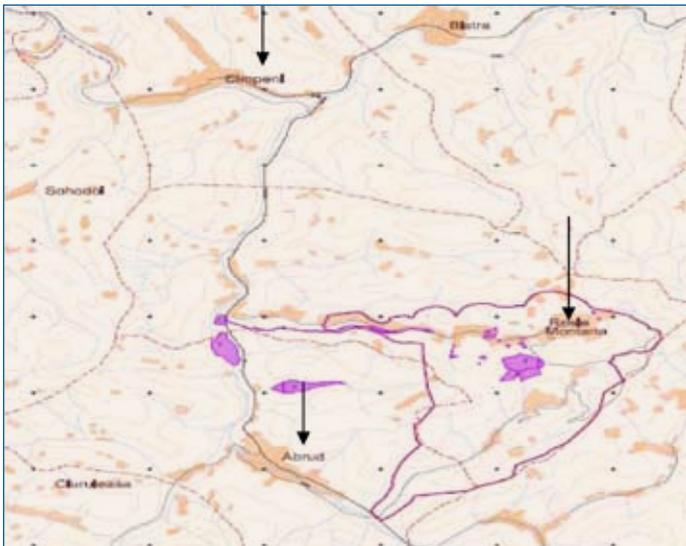
- The *orasul* of Campeni, about 16 km from Roșia Montană, which includes the town of Campeni and 21 villages, with a total population of 8,096 inhabitants (2002 census).

The location of human settlements in the area is the result of a combination of factors, mainly access to exploit mineral resources over thousands of years, but also agricultural land and water. Settlements concentrate in the three valleys of Roșia Montană, Corna and Abrud–Campeni.

Box A.1 The project area

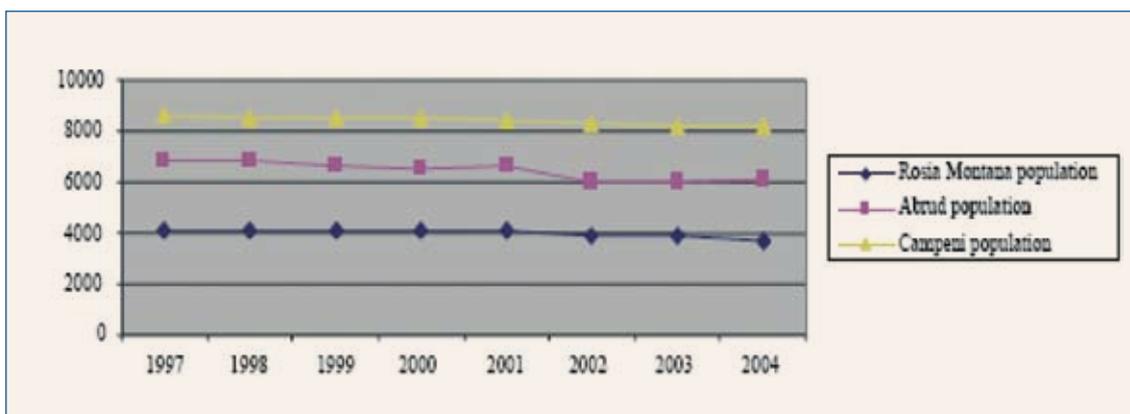
It is noted that the land requirement for the mine will have its largest absolute impact on the administrative region of Roșia Montană, where 1,050 ha (or 25% of the administrative area) will be involved. Thereafter, in order of the size of impact, the impacts will fall on the towns of Abrud and Bucium and the communes that surround the mine area: Cimpeni, Ciuruleasa, Bistra, Lupșa and Mogoș. This is a traditional mining area and the unemployment level of miners formerly engaged by the two state-owned companies of Minvest and RosiaMin is high. The comprehensive study of the project conducted in 2007/08 by a team from the University of Alba has suggested that there will also be an *extended impact area* covering a distance of ‘several tens of kilometres’ further from the impact area. The full extent of this extended area is difficult to pin down in precise terms without the benefit of detailed on-the-ground studies. However, the geographical extent of the area will be determined by several factors – but mainly by the existing road and other communication links beyond the impact area itself, and by the pre-existing social and economic relationships between communities inside and somewhat beyond the boundaries of the immediate area of impact.

Figure A.1 Locally affected communities (Campeni, Roșia Montană and Abrud)



Source: <http://www.rmgc.ro/en/>

In recent years, the populations of these areas have been in decline as a result of large redundancies from state-run mines, which have contributed towards outward migration and a falling birth rate (Figure A.2 only records population movements up to 2004, whereas it has been in the five years since then that the major outward migration has occurred). As a result of the changes in the economic make-up of the area, older women now comprise the largest population groups within communities, and within the adult population, averaging 58% in Roșia Montană, 44% in Abrud and 72% in Campeni.

Figure A.2 Population trends in the affected areas

The Social and Economic Environment of Roșia Montană (4.8), p. 17.

In recent years, increasing unemployment and poverty in Roșia Montană is claimed to be a direct result of the closure of state-owned mines in the immediate area (Cuprumin owned the mine in Abrud and RoșiaMin in Roșia Montană).¹⁰⁴ With the closure (in June 2006) of Roșia Montană and Roșia Poieni (situated in a nearby valley approximately 4 km north-east of the Roșia Montană project and owned by Cuprumin), thousands of jobs have been lost (1,002 and 1,286, respectively, in 2004 alone).¹⁰⁵ Inevitably, this has had significant social, environmental and economic impacts on Roșia Montană and Abrud, and the surrounding communities.

The closure of RoșiaMin alone resulted in unemployment in Roșia Montană increasing to approximately 60%.¹⁰⁶ In an area where 90% of people have been used to receiving regular salaries from employment in the mines,¹⁰⁷ and are still (in some cases) receiving redundancy payments, it would appear that there has not yet been a significant shift to agricultural activities to supplement household incomes. Thus, many people, to date, have remained as 'unemployed miners' rather than seeking alternative livelihoods. This is entirely understandable, given the lack of other employment opportunities, the technical nature of mining work and the relatively high remuneration of mining vis-à-vis subsistence agriculture.¹⁰⁸ There may well be other more local reasons for such 'sticky unemployment', including poor soil quality in the affected areas, which is noted as being unsuitable for potato and vegetable production, with most of the land that is cultivated being used for fruit or nut trees and animal forage.

For all of these reasons, the government has declared the mining area Apuseni Alba County as a depressed region, stating the following characteristics of the region as:

- a mono-industrial area;
- an area where 25% of the total workforce has been made redundant;
- an area where unemployment exceeds the national average by more than by 30%; and
- an isolated under-developed area.¹⁰⁹

The living conditions in the area are described in bleak terms. Environmentally, the area is considered to be in considerable need of rehabilitation as the water is polluted, landscapes are scarred and the infrastructure to provide water and deal with waste-water is either poorly developed or non-existent.

¹⁰⁴ Ibid.

¹⁰⁵ Non-Technical Summary Report, ch. 10, p. 53.

¹⁰⁶ Ibid.

¹⁰⁷ Ibid – Referenced as Alba Lulia Statistical Department 2005

¹⁰⁸ At a national level agricultural activities typically provide over half of household income (Data provided by RMGC by email on 23/06/2009 in document entitled 'Gabriel – poverty data 2').

¹⁰⁹ Non-technical Summary Report, ch. 10, p. 54.

Home ownership rates in Roșia Montană and Abrud have fallen with the out-migration of young people, while in Campeni, where greater employment and economic opportunities exist, home ownership has increased. The demographic profile in Roșia Montană shows how, in 2002, older women (aged 60–69) were one of the largest groups (shown in Figure A.3). It is anticipated that, in the seven years since this survey was undertaken, the large number of young men (20–29) will have fallen considerably from the previously dominant position.

Figure A.3 The age pyramid in Roșia Montană

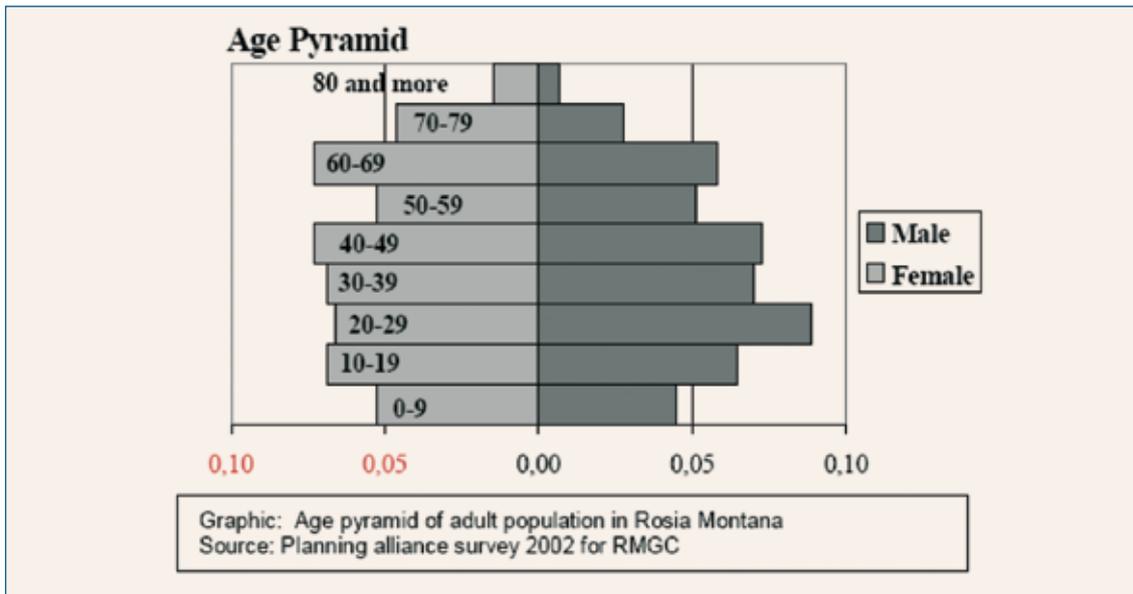
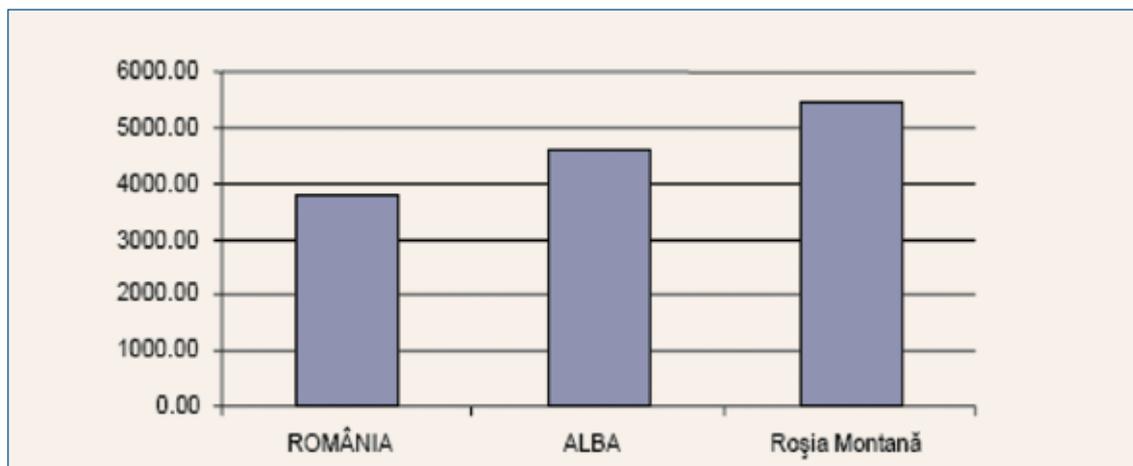


Figure A.4 Incidence of heart disease in Roșia Montană, per 100,000 people as compared with regional and national averages¹¹⁰



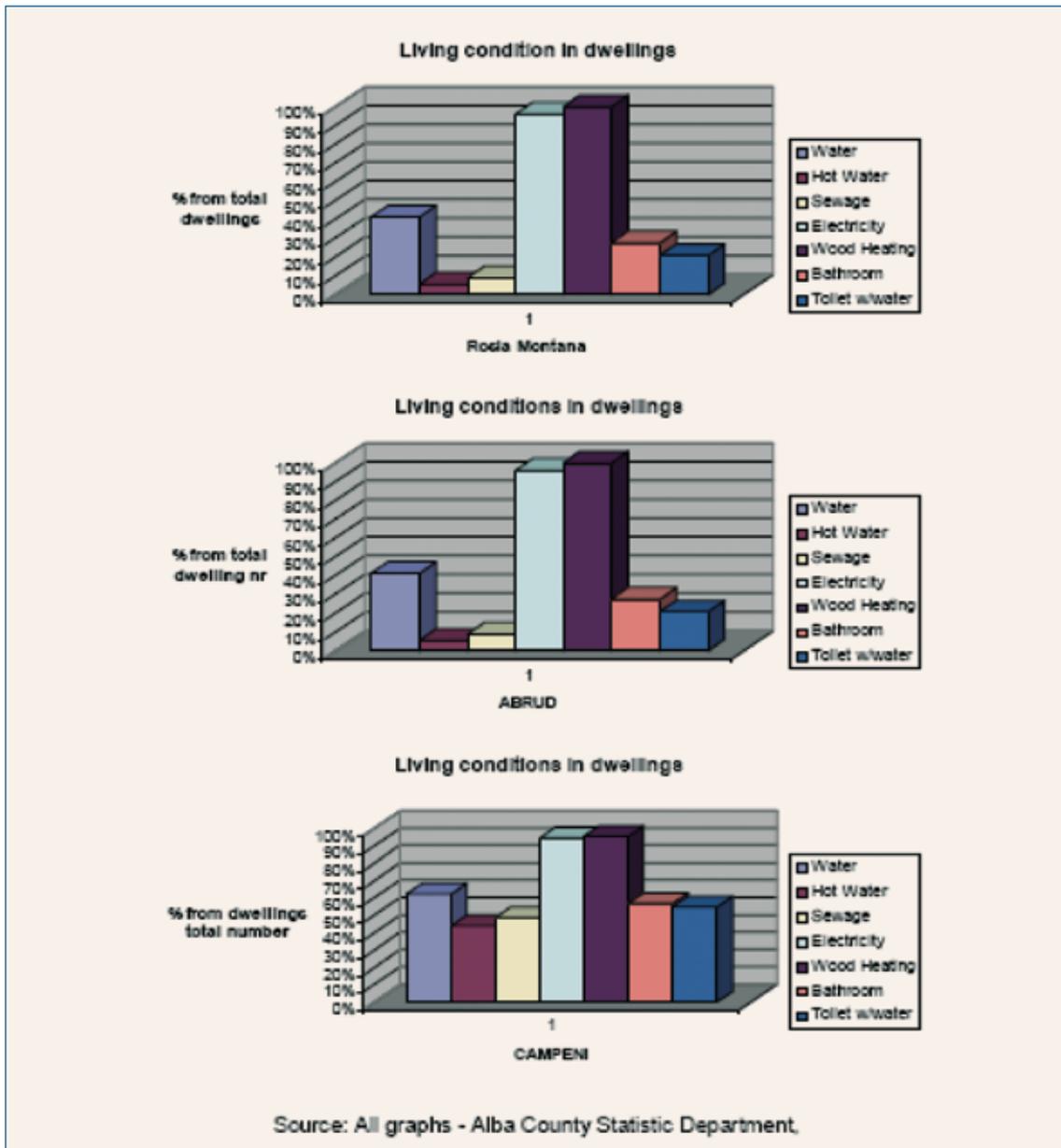
As shown in Figure A.4, poor health indicators for people living in the affected areas (as compared with national averages) confirm acute levels of poverty associated with high levels of unemployment and low levels of basic services. For many people, it has been the closure of a number of state-run mines (in 2006) and the lack of alternative employment opportunities that has compounded an already desperate situation. The effects on the large numbers of families either directly or indirectly impacted by the closure

¹¹⁰ 4.8. The Social and Economic Environment of Roșia Montană, p. 29.

of the mines have been worsening health problems and the effects of poverty (such as high fat diets, stress, depression and alcoholism are widely documented).

Other aspects of the living conditions of households are basic, and few households have adequate supplies of drinking water and sewerage services, or reliable energy supplies; waste collection and treatment are all poorly developed. Roșia Montană and Abrud would appear to have less developed basic infrastructure and systems than Campeni; few households have an inside toilet and bathroom. Most people rely on firewood for heating (see Figure A.5).

Figure A.5 Living conditions in Project-affected area (% of households)



Annex B Multiplier analysis: A technical guide

B.1 Introduction

Many effects of the RMP will permeate the real economy well beyond those domestic sectors that supply the goods and services, or the extra income to labour, during the construction and operating phases. The direct project expenditures will impact initially on a limited number of sectors (especially construction, and key raw material suppliers and services, as well as on local labour markets) but these are likely to precipitate further effects that spread throughout the economy. These are usually referred to as ‘multiplier effects’, because the total effect on economic activity is likely to be much greater than the initial expenditure stimulus. Obviously, while it is difficult to estimate the full range of multiplier effects, it is possible, nevertheless, to estimate the likely magnitude and extent of some of the key responses.

The particular responses that are usually measured by analysts are twofold. First, there are the multiplier effects due to the interdependencies between production sectors. These are the inter-industry (I-O) effects, which arise because any extra demand for domestically-produced goods or services will lead to an increase in the demand for raw materials which, in turn, prompt further domestic supply. The second group of multiplier effects are those arising from the increase in income to domestic labour, and the subsequent spending by households out of this income, leading to a further stimulus to domestic output and income. These are the Keynesian multiplier effects. It is usual to refer to the multiplier effects due to the former as ‘indirect effects’ and those due to the latter as ‘induced effects’.

This annex sets out the methodology used to estimate the magnitude of the indirect and induced effects of the RMP, tracing these from the direct impacts in each year of the construction, production and closure phases through to the total estimated effects.

B.2 Methodology

B.2.1 Multiplier analysis

The Keynesian multiplier captures the relationship between the initial domestic income generated by an investment project and the subsequent income induced by household spending on domestically-produced goods and services. The size of the multiplier is dependent on the marginal propensity to consume and, correspondingly, on the size of the leakages – leakages being the part of income not spent on domestic goods and services. In the case of the Keynesian multiplier, leakages would include spending on imported goods, saving and taxes. This is because the latter would not necessarily lead to further spending on domestic goods and, hence, would not generate additional income.

B.2.2 Input–output analysis and multipliers

The Keynesian multiplier is an aggregate concept. For present purposes, we need to make use of more disaggregated approaches that capture the sectoral detail of the economy and so recognise the different points at which the direct expenditures may be injected into it. I-O analysis is a well-established methodology for deriving various kinds of multipliers and has been extensively used in impact analysis (Bulmer-Thomas, 1982; Miller and Blair, 1985).

The essence of the I-O model is to set out and formalise the nature of the economic interdependence (linkages) between the domestic production sectors. Specifically, the main idea is that, to produce a unit output of any good or service, the sector in question requires inputs of labour and capital (i.e. generating value-added) and raw material and other manufactured inputs (i.e. intermediate inputs). These various inputs may be imported or domestically produced. If they are domestically produced, then this will

generate further demands and, hence, further output requirements by other domestic sectors, leading to yet more income generation. In turn, these outputs will generate more input requirements, and so on. In a similar way to the aggregative Keynesian multiplier, the I-O model is a method of calculating the *total* direct and indirect effects of an initial stimulus. In the case of the RMP, this initial stimulus comes from expenditures each year during each phase of the project.

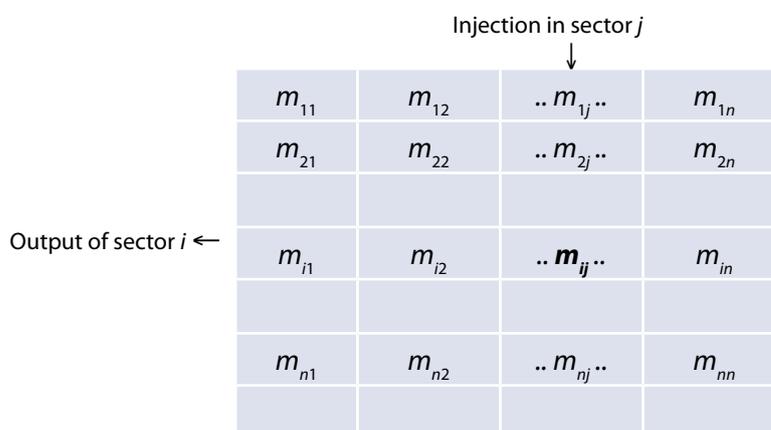
The main basis of the I-O model is to assume there is a simple *linear* relationship between inputs and outputs, at least as a good approximation. More precisely, the assumption is that input requirements per unit of output are technologically fixed: this is the so-called ‘fixed coefficients’ assumption. However, these technologies may well vary across sectors. Thus, for example, the input requirements per unit output of agricultural sectors will be fixed and will be different from those of manufacturing sectors or services. Injections will therefore generate *different* levels of direct and indirect response depending on the sectors in which the injections originate. The fixed I-O coefficient assumption is usually considered to be a good first approximation, especially if there is a reasonable disaggregation of production sectors.

The I-O model generates a set of multipliers. By using the fixed coefficient assumption, the total direct and indirect output response of all domestic sectors that arise as a result of any exogenous impact (i.e. the initial demand stimulus) can be calculated. The results are ‘multipliers’, in the sense that the total output response of each sector must be at least as large as the initial impact. So, the results of the model show the likely effect of a unit increase in the demand for the output of sector *j* (e.g. manufactured goods) on the output requirements of other sectors (e.g. services). Thus, the likely *total* effect on manufacturing would be to boost its output by more than one unit due to possible indirect effects (i.e. the need to supply raw material inputs to other sectors) that feed back to manufacturing. Also, the likely effect on services would be positive, even though the *initial* impact on services may be zero – due to the indirect demand for services. Clearly, the size of these multipliers is entirely dependent on the degree of interdependence between sectors.

The I-O model just described is an ‘open static’ model. This means that the responses that are being modelled are confined to the production responses, thereby excluding the possible responses of workers and owners of capital who might spend income and boost activity levels further. It also excludes ‘dynamic’ responses, so there is no indication of how long it might take for the multiplier effects to work through the system, or whether the output responses might require (and, hence, precipitate) further investment (i.e. fixed capital formation). So, the aim of the I-O model is to capture an important part, though not necessarily the totality, of the economy-wide impact of the project.

The I-O model calculations generate a set of sectoral gross output multipliers. Formally, if *A* is the matrix of I-O coefficients (input requirements per unit of output), then the resulting gross output multipliers can be represented by the matrix *M*, where $M = (I - A)^{-1}$.

Figure B.1 Input–output multiplier matrix M



In Figure B.1, the ij the element of M (say m_{ij}) shows the gross output response of sector i arising from a unit expansion (i.e. the initial stimulus) of sector j .

The full relationship between an injection of project expenditures X – as demands for goods and services from domestic sectors – and the total outputs Y necessary to deliver X , is:

$$Y = (I - A)^{-1} X = MX$$

where both X and Y are n -element vectors, representing demands and outputs, respectively, for each of the n sectors.

B.2.3 Output, income and employment multipliers

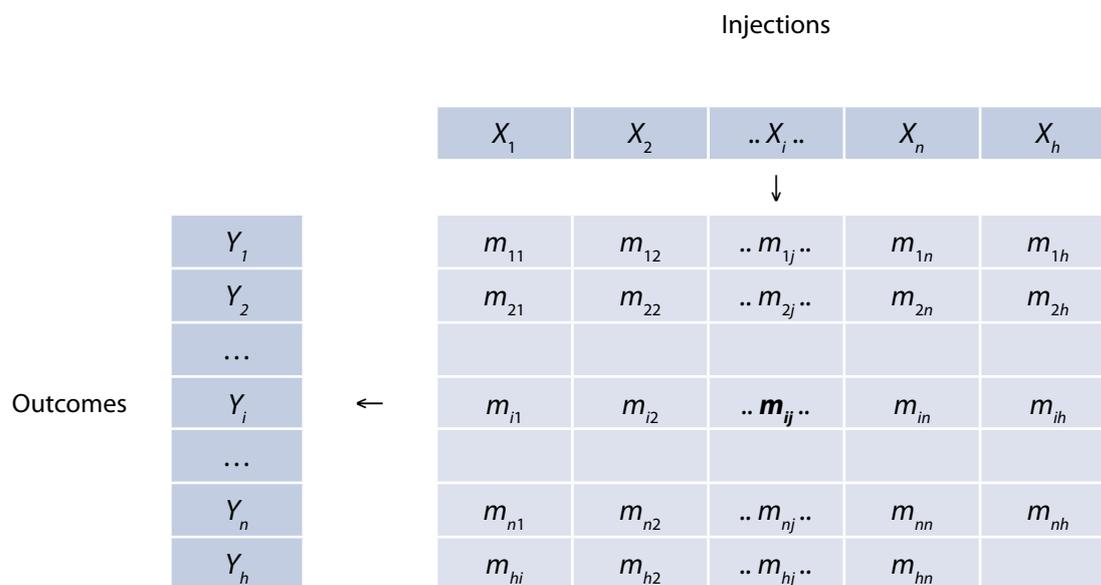
It is usually possible to calculate a range of multipliers that are linked, to X and Y . In particular, these are the output, income and employment multipliers. In essence, an *output multiplier* would be to take the ratio of Y to X ; that is, to express the total direct and indirect impact on output Y as a ratio of the initial output requirements X . An *income multiplier* would be to express total (wage) income generated as a proportion of the initial wage income from the project. Similarly, an *employment multiplier* would express the total employment generated (i.e. from all new economic activity) as a ratio of the initial employment in the project. There are several variants of these multipliers; for example, sometimes they are shown sectorally, as well as in aggregate. More formal definitions of these concepts follow shortly.

B.2.4 Type I and Type II multipliers

As noted, the I-O model captures only the responses that are due to the interdependence between production sectors. All other economic responses are treated exogenously (i.e. determined separately from the model and not *by* the model). The output, income and employment responses that are calculated on the basis of the I-O model are called 'Type I' multipliers. However, if the incomes generated directly and indirectly by the project lead to further spending on domestically-produced goods and services, then this leads to more stimulus to economic activity and this may further enlarge the multiplier effects. A further set of multipliers, which take account of the income and expenditure behaviour of households, can be obtained and these are called 'Type II' multipliers. Effectively, Type II multipliers combine Type I I-O multipliers with Keynesian multipliers. Type II multipliers take into account not only the *direct* and *indirect* effects due to production linkages, but also the *induced* effects due to the increase in household income and the associated changes in household spending on domestic products. Most analysts prefer to compute Type II multipliers, as they account for more of the likely consequential effects of project expenditures.

Type II multipliers are obtained by adding one row and one column to the I-O coefficient matrix. The row coefficients show the household income generated per unit of output of each sector. The column coefficients show the household expenditures per unit of household income (i.e. the propensities to spend). Note that the enlarged effects from the Type II multipliers arise insofar as households spend their extra incomes on *domestically-produced* goods and services. All spending on imports, savings and taxes are treated as leakages, as they are not income-generating expenditures. The multiplier matrix for Type II multipliers is obtained similar to the I-O multipliers, although the matrix A (and, in consequence, M) is enlarged by one row and one column now that households are an endogenous 'sector'.

Figure B.2 Type II matrix multiplier M



Injecting X into the multiplier effectively means feeding elements of X down the columns of M . The outcomes are in terms of elements of Y – summing the total effects along the rows of the resulting matrix.

Thus, for example:

$$Y_i = m_{i1}X_1 + m_{i2}X_2 + \dots + m_{ij}X_j + \dots + m_{in}X_n + m_{ih}X_h$$

where, for example:

$m_{i2}X_2$ = total output requirements of sector i due to a project expenditure on goods and services from domestic sector 2, taking into account both the indirect and induced multiplier effects of further outputs and incomes generated

$m_{ih}X_h$ = total output requirements of sector i due to a project expenditure on labour (wages paid to Romanian workers), taking into account both the indirect and induced multiplier effects of further outputs and incomes generated.

B.2.5 Output, income and employment multipliers again

The output, income and employment multipliers can easily be defined and represented using Figure B.2 as a basis. Take X_p to be either the total expenditure on domestically-produced goods and services, or expenditure on a particular product P, and similarly for Y_p . Then

Output multipliers are $\frac{Y_p}{X_p}$ or: total output requirements (direct, indirect and induced) as a ratio of direct project demands;

Income multipliers are $\frac{Y_h}{X_h}$ or: total wage income generated (direct, indirect and induced) as a ratio of direct project wage costs;

Employment multipliers are ratio(s) of total employment generated ($e_1Y_1 + e_2Y_2 + \dots + e_iY_i + \dots + e_nY_n$) expressed as a ratio of the direct employment in the project (E_p). Employment is usually expressed in terms of full-time equivalent workers (FTEs). The coefficients e_i are numbers of FTE workers per unit of gross output of each sector. The base year employment estimates by sector are an additional base year data requirement.

B.3 Input–output tables for Romania

The methodology is dependent on the existence of an I-O table for Romania. The Romanian National Institute of Statistics (INS) routinely publish supply-use (SUT) and symmetric I-O tables, according to the ESA 1995. The most recent table available is for the year 2006, although there are several versions of it. The most detailed version is at the 105 sector NACE disaggregation, although there does not appear to be a 'domestic flows only' version of this table.

The preferred version for present purposes was a 59 sector NACE disaggregation of this table, available from Eurostat.

See: http://epp.eurostat.ec.europa.eu/portal/page/portal/esa95_supply_use_input_tables/data/workbooks

This includes not only a 'domestic flows only' table but also some detail on payments to value-added (with compensation of employees, wages and salaries, imports, operating surplus, and net taxes on production separately identified). Minor modifications were made to this table to carry out the multiplier computations.

- **Classifications:** The 59 sectors were effectively 54 after excluding those sectors for which no production was recorded in Romania in 2006. Table B.1 lists the 54-sector classification.
- **Household income:** The Romanian I-O table records 'compensation of employees' by sector, but direct income payments from production sectors to households should also include income to employers and own-account workers. The national accounts do record an aggregate figure for 'mixed income', but not by sector. Hence, it was necessary to allocate this figure across sectors in order to arrive at a more accurate estimate of household income by sector. This was achieved by apportioning it according to 'operating surplus' by sector.
- **Household expenditure coefficients:** To derive these, household expenditures on domestic products were divided by total household expenditure, assuming savings are zero. In 2006, the national accounts record household savings as being negative, but this would have yielded unreasonably large expenditure coefficients, so savings were set at zero, to represent more reasonable 'steady state' coefficient estimates.
- **Currency units and exchange rates:** The project estimates are shown in US dollars, whereas the I-O tables are recorded in Romanian currency units (RON). For the majority of the computations, this is not a problem because the I-O coefficients are simply structural ratios and, hence, currency values cancel out. In one computation, however, the derivation of employment (FTEs) to output ratios (e_i), it was necessary to convert gross outputs from RON to US dollars. A mid-year (2006) exchange rate of 2.81745 RON to US\$1 was used for this purpose.

Table B.1 Classification of sectors in the input–output table for Romania, 2006

1	Products of agriculture, hunting and related services
2	Products of forestry, logging and related services
3	Fish and other fishing products; services incidental of fishing
4	Coal and lignite; peat
5	Crude petroleum and natural gas; services incidental to oil and gas extraction excluding surveying
7	Metal ores
8	Other mining and quarrying products
9	Food products and beverages
10	Tobacco products
11	Textiles
12	Wearing apparel; furs
13	Leather and leather products
14	Wood and products of wood and cork (except furniture); articles of straw and plaiting materials
15	Pulp, paper and paper products
16	Printed matter and recorded media
17	Coke, refined petroleum products and nuclear fuels
18	Chemicals, chemical products and man-made fibres
19	Rubber and plastic products
20	Other non-metallic mineral products
21	Basic metals
22	Fabricated metal products (except machinery and equipment)
23	Machinery and equipment
24	Office machinery and computers
25	Electrical machinery and apparatus
26	Radio, television and communication equipment and apparatus
27	Medical, precision and optical instruments, watches and clocks
28	Motor vehicles, trailers and semi-trailers
29	Other transport equipment
30	Furniture; other manufactured goods
31	Secondary raw materials
32	Electrical energy, gas, steam and hot water
33	Collected and purified water, distribution services of water
34	Construction work
35	Trade, maintenance and repair services of motor vehicles and motorcycles; retail sale of automotive fuel
36	Wholesale trade and commission trade services (except of motor vehicles and motorcycles)
37	Retail trade services (except of motor vehicles and motorcycles; repair services of personal and household goods)
38	Hotel and restaurant services
39	Land transport; transport via pipeline services
40	Water transport services
41	Air transport services
42	Supporting and auxiliary transport services; travel agency services
43	Post and telecommunication services
44	Financial intermediation services (except insurance and pension funding services)
45	Insurance and pension funding services (except compulsory social security services)
46	Services auxiliary to financial intermediation
47	Real estate services
48	Renting services of machinery and equipment without operator and of personal and household goods
49	Computer and related services
50	Research and development services
51	Other business services
52	Public administration and defence services; compulsory social security services
53	Education services
54	Health and social work services
55	Sewage and refuse disposal services, sanitation and similar services

Source: INS Romania/Eurostat: ROMANIA SUIOT_090604

B.4 Computations

B.4.1 Calculating the X-vectors

The impacts of the project have been analysed for the spending and revenue estimates provided for each year during the construction, production and closure phases of the RMP. Spending estimates were prepared and provided for 27 years, plus two pre-production years (i.e. the construction phase). The categories of spending included: Initial capital earthworks, Mining Opex, Process Opex, Owners Opex, Refining and Transport, Owner Sustaining Capex, Sustaining Capital, and Closure costs. In each case, the costings listed detailed labour costs, and material and service costs – in most cases, split further according to whether they are local, regional, national, EU and non-EU expenditures. As the multiplier analysis has been carried out at an ‘all-Romania’ level, the key subdivisions used were ‘Romania’ (i.e. local, regional and national) and ‘foreign’ (i.e. EU and non-EU) spending.

The detailed components of domestic material and service costs were attributed to spending on the output of particular I-O sectors by simple observation. These then formed the elements of vector X_p . Likewise the domestic labour costs became the injections of household income (X_h). Having established the precise rules that map individual components of the project costs into the I-O sectors, the X-vectors for each of the years could be assembled.

B.4.2 Computing the Y-vectors

The final computations follow the methodology set out in Section B.2. The Y-vectors give us total output and total income estimates directly. The total employment (FTEs) estimates are computed via employment–output ratios (e_j) and the total output results.

B.4.3 Estimating sectoral employment (FTEs) in the base year

Employment estimates for Romania in 2006 are published in the *Romanian Statistical Yearbook 3* (Labour Market), table 3.3). The sectoral breakdown is limited, so a disaggregation of employment (FTEs) across 54 I-O sectors was estimated using data on wages and salaries from the I-O table.

B.5 Technical limitations

Notwithstanding their widespread use in impact analysis of the type involved here, the I-O multipliers as just described involve significant limitations that need to be borne in mind when assessing the results. Fortunately, it is possible to make certain broad statements about the direction of possible biases that may result from these multiplier calculations.

B.5.1 Features

A standard I-O model captures the inter-industry multipliers and, hence, the direct and indirect impacts. The principal assumptions underlying the model are that the base year input structure reflects the inherent technical input requirements of sectors, and that there is excess capacity in domestic production and an excess supply of labour. One particularly advantageous feature is that the model can be calibrated with a single set of base year data (i.e. the I-O table). In many I-O analyses, the inter-industry structure is augmented by household income and expenditure coefficients so as to capture the income generating and spending behaviour of households within the model. This generates so-called ‘Type II’ multipliers. ‘Type I’ multipliers capture the indirect effects but not the induced effects. Many analysts view the Type II model as providing a reasonable first approximation of the economy-wide multiplier effects: just how good an approximation this is will depend on a multitude of factors.

B.5.2 Some caution in interpreting the input–output multiplier results

Notwithstanding their simplicity, transparency and widespread use, I-O multipliers do have significant limitations that need to be borne in mind when assessing the results. In particular:

- The existing input structure might not accurately reflect incremental inputs necessary to meet the project demands. This is because input technologies might change, or relative prices might change, leading to substitutions between inputs.
- There may be supply constraints in some domestic sectors or in the availability of certain kinds of labour. If so, then the multiplier effects obtained will be overestimates of the true output or income response.

While Type II multipliers may be considered a first approximation, the secondary and economy-wide effects are likely to be much more extensive and complex. Attempts to establish a better approximation leads some modellers into developing much more sophisticated models (such as computable general equilibrium (CGE) models) that embrace more behavioural responses and market behaviour. These models are not necessarily any better; they require more data, invoke many assumptions and are certainly less transparent. In fact, in some respects the I-O model can be considered as a particular variant of a CGE model – that is, it is a ‘limiting case’, reflecting a particular set of macroeconomic and microeconomic ‘closures’. It is not, therefore, a substantially different kind of model.

If either of the I-O assumptions is not valid, then the Type II results may *overestimate* the economy-wide responses. On the other hand, the fact that only limited endogenous behaviour is incorporated in the I-O model means that the model is likely to *underestimate* the total impact of the project. So, the net conclusion is that the I-O (Type II) model may well deliver a first approximation to the total direct, indirect and induced effects of the project.

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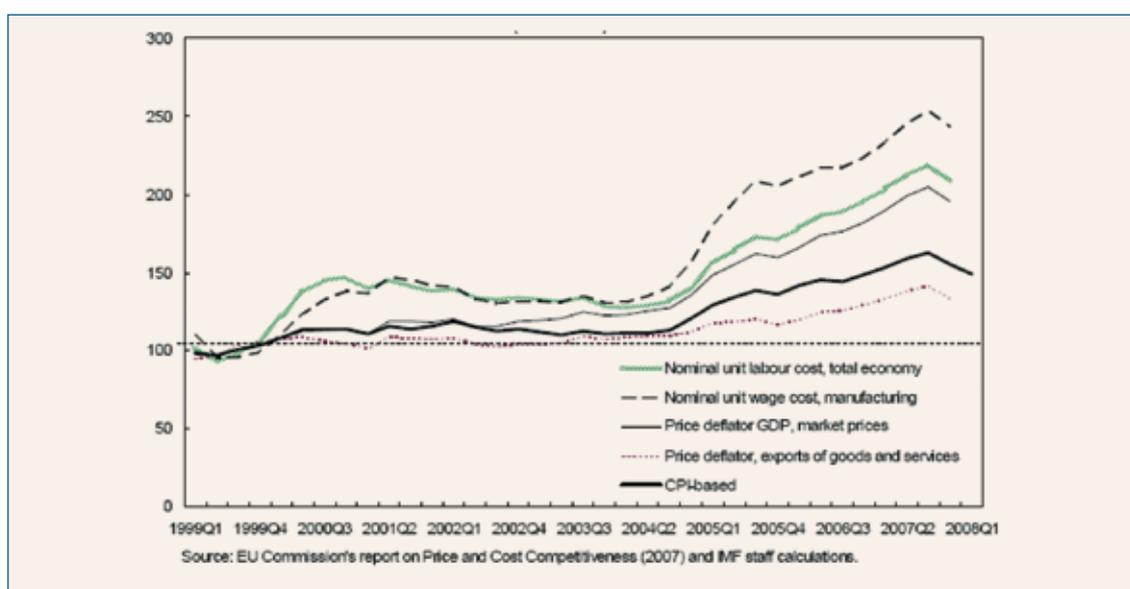
- Bulmer-Thomas, V. (1982) *Input Output Analysis in Developing Countries, Sources, Methods and Applications*, Wiley: Chichester.
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Annex C Will the Real Exchange Rate Appreciate?

This annex examines one of the major macroeconomic dangers that surround any large natural resource project: that of creating unintended negative economic impacts via exchange rate over-valuation. We once again consider the construction and operations phases of the project separately.

In its July 2008 assessment of the Romanian economy,¹¹¹ the IMF devoted considerable attention to the tendencies of the nominal and real effective exchange rate¹¹² in the context of the country's gradually increasing integration into the EU economic system. Their analysis indicated that, since 2004, Romania's real effective exchange rate had experienced strong appreciation. Since that date and through mid-2007, the consumer price (CPI)-based real exchange rate index appreciated by over 47%. However, that tendency was arrested by the global crisis and the associated nominal depreciation of the Romanian lei. Specifically, from August 2007 the lei depreciated by over 15% vis-à-vis the Euro, resulting in a notable **real** correction of the effective exchange rate. By end-March 2008, the CPI-based REER had dropped by about 4% relative to its mid-2007 level. At the same time, the manufacturing unit labour cost (ULC)-based measure of the real exchange rate has nearly doubled. Details of these and other measures of the REER, over time, are shown in Figure C.1.

Figure C.1 Real effective exchange rates, 1999–2008 (1999 = 100)



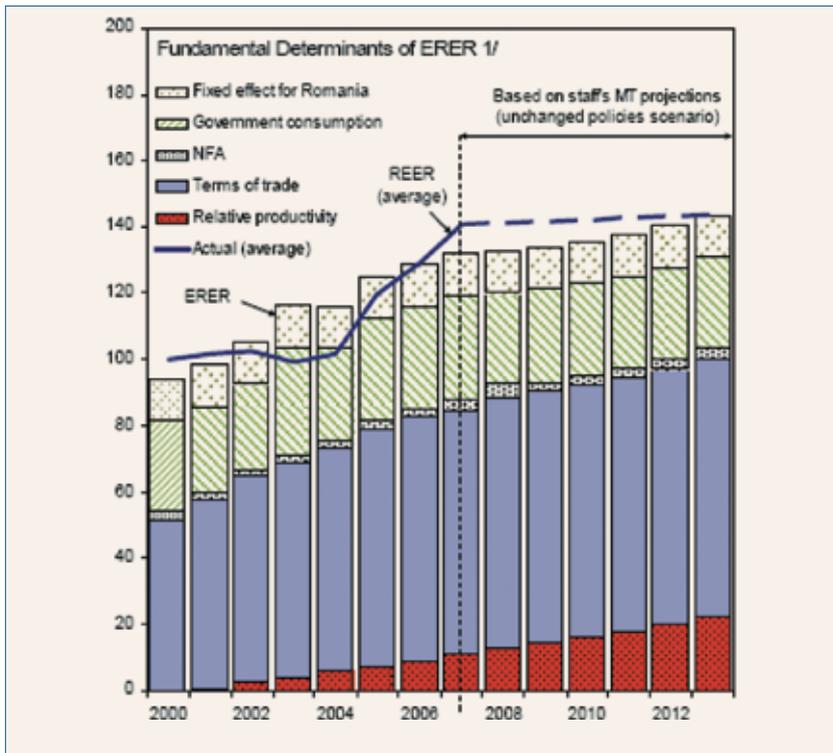
The IMF has taken a relatively positive view of these recent developments. The apparently large and worrisome developments regarding the unit labour cost measure of the REER were discounted by the Fund. This was mainly on the grounds that much of this increase seems to have reflected a catch-up from previously low levels and a tightening labour market. But it was not reflected (at least, during March 2008) in any evidence of the erosion of profit margins in the tradable sectors of, for example, manufacturing. In short, the main negative consequences of an over-valued real exchange rate were not apparent in the evidence to that date.

111 This was reported in Romania: Selected Issues, IMF *Country Report* No. 8/210, July 2008.

112 The nominal effective exchange rate (NEER) measures the weighted averages of the various different nominal rates against different currencies maintained by Romania (i.e. dollars, euros, pounds, yen) with the weights reflecting the importance of different trading partners. The real effective exchange rate (REER) measures the same thing, but now with the movements of the nominal rates being adjusted for inflation differentials with the various trading partners.

The IMF has also built a model to enable it to assess the actual level of the REER against the equilibrium level. This work suggested that the recent upward movements of the REER have largely mirrored those of the equilibrium rate. This proposition derives from the model's findings about the key determinants of the equilibrium value of the REER (equilibrium real exchange rate – or EREER, for short). These are shown in Figure C.2, which is extracted directly from the IMF report.

Figure C.2 Determinants of the equilibrium real exchange rate (ERER), 2000–13



Source: IMF, July 2008, fig. 7, p. 18

These results from the IMF indicate that Romania, in spite of the recent crisis, is proceeding relatively well in its convergence to EU conditions. Improved productivity is enabling the country's export industries to exist with a somewhat higher value for the real exchange rate. Indeed, all the evidence from the past decade is that Romania is gaining market share in its key markets in both the transition economies of the former Soviet Union and central Europe and, more importantly, in the EU. This tendency has been further assisted by improving terms of trade and the ability – notwithstanding its current account deficit – to accumulate significant net foreign assets. The question for our own assessment is whether Roșia Montană of itself is sufficiently significant to exert any influence on this situation, and on the future tendencies projected in Figure C.2.

Box C.1 Why is the real exchange rate important?

Large natural resource-based export projects, such as the RMP, create new jobs and new productive possibilities, especially for those activities that can directly supply the new project. But these positive effects can easily be offset in whole, or in part, through a *negative* impact on the existing (and prospective future) internationally tradable products of such economies. This negative effect will arise if the *real exchange rate* (RER) of the economy appreciates significantly. This is often referred to as the 'Dutch Disease' and has two effects. *Internally*, it moves the profitability (and incentives) of local businesses away from producing for international export and towards increased sales in the local market, and so discourages potential exports. *Externally*, by making imported goods relatively cheaper, it stimulates increased demand for imported goods, and so aggravates the worsening of the external accounts already harmed by the reduction of *non-mineral* exports.

To the extent that these negative offsetting effects are large, then a natural resources project will fail to play the role of a catalyst promoting broader-based and more diverse economic development around a widening range of economic activities. Instead, it may help to perpetuate a relatively limited basis for economic development and prosperity linked narrowly to the natural resources such as oil, gas or minerals. Countries with much lower incomes than Romania provide us with the most poignant example of this aspect of the 'natural resource curse'. For example, Nigeria is an economy that has been richly endowed with oil and gas reserves for many years, but has lost most of its non-oil export capacity and remains as one of the poorest countries in sub-Saharan Africa!

Romania is a relatively mature industrial and diversified economy, and so should be able to absorb a project such as Roșia Montană with fewer risks of currency over-valuation than we would expect in poorer agrarian economies. But the coming on stream of the RMGC project, and potentially other new mineral projects that might follow behind Roșia Montană, will somewhat increase the country's rate of dependency on natural resource exports, at least in the short term. The longer-term success of the project will be judged, in part, by whether it can become the stimulus for new non-mineral-based activity, especially in the deprived areas in and around the mine site. Whether 'success', in this sense, will be achieved will be dependent, in part, on the effective management of the exchange rate and the avoidance of serious over-valuation.

The construction phase

In this phase of the project until about 2013, a large part of the project outlays will be on imported capital goods and associated services, including a component of wage costs associated with internationally recruited labour. This will mean that the large foreign exchange inflows of this period (equity and debt) will be set off against additional imports. So, it is unlikely for there to be any major net injection of liquidity into the domestic economy that could create nation-wide inflationary problems.

Specifically, the injection of the new investment funds of some \$1,300 million into the domestic economy over two years will be associated with a relatively large boost in local employment associated with the construction phase of Roșia Montană, and the accompanying expenditure on locally sourced goods and services. In Section 4.5, it was estimated that the first of these effects would result in around \$55 million per annum of extra wage and salary payments to Romanian workers, and a further \$8 million to expatriates. In Section 4.2 of the main report, it was estimated that the second of these effects would result in an estimated \$194 million of extra local procurement of various goods and services per annum during construction. So, the *total direct local spending* impact will be approximately \$250 million per annum for the two years of the construction period. Although this is a large *absolute* figure, it is small when compared to the large FDI flows that Romania has successfully absorbed in many of the preceding years without generating major real exchange rate overvaluation.

Furthermore, since this injection seems likely to begin at a time that could still be characterised by ongoing recession – the IMF is projecting at least a 4.1% decline in Romania's GDP in 2009 (possibly up to 8%) and

zero growth in 2010 – the inflationary impact at the national level will be minimal. Indeed, if the RMP can begin the construction phase in 2011, as we have assumed in this report, then it could provide a welcome part of the macroeconomic recovery for the economy. Any anxieties about the project causing a significant real exchange rate appreciation would be misplaced.

However, we do need to remember that a large part of the project wage and salary payments, and a good part of the additional local procurement, will occur in the directly and indirectly-impacted areas near the mine site. These *local* demands (estimated at around \$73 million during construction and \$50 million during operation) will confront a local supply (both of labour, and goods and services) that is necessarily limited. So, *there is some likelihood of a local inflationary effect, especially during the construction period when the demands are large and the supply responses may be a bit slower to appear.* This danger will need to be carefully managed, both by the RMP and by the various local and regional authorities who have some responsibility for labour market management and the provision of supporting infrastructure (such as housing and water supply). This localised Dutch Disease effect could well, in its turn, shift some local resources in these areas away from export activity, unless the demand pressures are matched by specific SME and other programmes to encourage export-oriented as well as demand-based local industries.

The operations phase

In this phase of the project from Year 1 (assuming construction starts in 2011, operations would begin in 2013), the issue becomes somewhat more complex because, from that point on, there will be at least three sources of upward pressure on the relative prices of non-tradable goods. These are:

1. the spending of the wages and salaries of project workers;
2. the other company spending on supplies of goods and services; and
3. the spending of some part of the extra fiscal revenues and dividends that will arise from the project.

All three of these effects could stimulate multipliers of second and third round effects.

In Section 4.5, we estimated the annual magnitude of (1) to be about \$23 million per annum in terms of *direct* employment. The annual magnitude of (2) will be around \$96 million. The magnitude of taxes and dividends paid to the different levels of government will average \$95 million per annum for the main 18 years of the project's life. Even if it is assumed that a large part of the additional government revenues will be spent, for example 90%, then the annual magnitude of (3) into the economy would be of the order of \$86 million per annum. But, as was noted in the main report in a situation of significant fiscal deficits, there is a strong presumption that the government will be cautious in spending any additional revenues that may come its way. Once again, the comment can be made that, although the potential spending amounts to a large absolute amount of money, it does not represent a particularly large proportion of the country's total existing income and spending. Certainly not sufficiently large to cause a radical shift in the balance of prices in a manner that could significantly harm the competitiveness of Romania's traded goods sectors. Overall, *there seems little likelihood of a significant national impact on the REER.*



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