A Framework for the Taxation of Natural Resources in Israel

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INTRODUCTION

1. We have been asked by the Israeli Ministry of Finance to develop a general economic framework for the taxation of natural resources in Israel. We were also asked to focus, at least initially, on the potash, bromine, phosphate, and magnesium mining operations in Israel and throughout the world. We understand that there are two potential ways that the Ministry of Finance will look at taxation. One is based on the profits from the extraction and sale of these minerals, and the second is based on a return on capital investment. We have examined both and, on the basis of this analysis, propose a framework for taxation of these natural resources. This work was done under the direction of Robert S. Pindyck, Bank of Tokyo-Mitsubishi Professor of Economics and Finance, Sloan School of Management, Massachusetts Institute of Technology, with the help of staff from Analysis Group, Inc., an economic consulting firm.

2. **Outline.** This report is organized as follows. First, we provide a discussion of the framework for thinking about the taxation of mineral resources. This is important, because these resources belong to the State of Israel, and there is no reason why private firms should be able to exploit those resources without paying an appropriate compensation to the State. The issue, of course, is how large that compensation should be.

3. The following sections of the report examine the operations of Israel Chemicals Ltd. (ICL) for mining potash, bromine, phosphate, and magnesium in detail. We consider prices and production costs, and provide an assessment of the profitability of Israeli mining operations including a comparison to the profitability of competitors worldwide. We then compare the profitability of the Israeli mining operations in each of the four minerals to relevant industry benchmarks. Next, we provide an analysis of the cost of capital in the event the Committee wishes to consider a taxation framework based on a rate of return on investment. We use the Capital Asset Pricing Model (CAPM) to determine a normative rate of return for the mining industry. We conclude with a discussion of how our findings on both profitability and rate of return could be incorporated into a taxation scheme.

FRAMEWORK FOR TAXATION OF MINERAL RESOURCES

4. A good starting point for thinking about the taxation of mineral resources is to consider **Exhibit 1**, which presents the profitability of ICL's operations, relative to the mining industry generally. By any common measure of profitability, ICL has been earning higher profit margins on its production of potash, bromine, and phosphate rock than what one observes in the mining industry generally. For instance, the interquartile average operating margin for non-metal mining companies never exceeded 16 percent

in the years 2008 to 2012; ICL's potash operations' *lowest* annual operating margin in that timeframe was [redacted] percent (in 2010), and was as high as [redacted] percent (in 2009).[1] **Figure 1** below shows this information graphically.

Figure 1. Industry group profitability comparison, 2008 – 2012

5. Similar magnitudes of difference are observed in **Exhibit 1** for other measures of profits – gross margins and net income – relative to the same benchmark.[2] For ICL's bromine operations, the *lowest* annual operating margin in that timeframe was [redacted] percent, and was as high as [redacted] percent, with similarly high gross and net income margins. For phosphate rock, operating margins were typically greater than the benchmark groups, with values ranging from [redacted] percent to [redacted] percent, while gross and net income margins were much larger than the benchmark values. In contrast to the other ICL products, for magnesium, ICL's profitability appears to be more in line with broad industry averages.

6. Why is this? What is the source of ICL's unusual level of profitability in potash, bromine, and phosphate, and should ICL consequently be taxed differently than it has been in the past? This report explores these questions.

7. **The basis for taxation.** Mineral producers must recover their marginal cost of

[1] Operating margin is defined as earnings before interest and taxes divided by revenue. This definition is used throughout this report.

[2] Gross margin is defined as total sales less cost of sales plus depreciation as a percentage of revenue. In some instances in this report, we calculate gross margin including depreciation expense. Where that definition is used, it is noted. Net income is after tax.

extracting the mineral in order to remain in business. For the highest marginal cost potash producer, for example, there is still economic value inherent in producing potash. That is, the revenue received from potash is just sufficient to cover the operating costs of extraction (including a competitive markup). In a competitive market for potash, price will equal marginal cost for the highest marginal cost producer.

8. Now consider that not all producers have the same marginal cost of production (i.e., some reserves are easier to develop than others). Specific characteristics of a mineral reserve can reduce the marginal cost of extraction relative to the highest cost producer, thereby allowing some producers to earn higher profits than other producers and, importantly, higher than the amount required to stay in business. The resource in the ground, which is owned by the government, provides the source of this cost advantage and is, in effect, "rented" to the mining company as a form of capital. The question therefore is how much the government should receive for "renting" the more valuable resource to the company, so that the company may use the resource, along with equipment and labor, to extract the mineral, and still earn profits.

9. The value of this production cost advantage can be estimated as the difference between the mineral price and a mineral producer's marginal extraction cost. If the tax were to exceed these "excess" profits (i.e., the amount by which revenues exceed marginal costs), the company could not cover its costs in the long run, and would likely go out of business. But if the tax is set in such a way as to capture no more than the "excess" portion of profits, the company will still earn a competitive profit and will be able to stay in business.

10. **Rate of Return.** Up to this point, we have focused the discussion on profits rather than rate of return. In an industry that has intensive capital investment, the rate of return on that investment is an important measure that must be included in an economic framework for taxation. For example, in the development of a new offshore oil or gas field, the required capital investments are very large and must be made prior to generating any profits. Companies making such investments must expect to be able to earn a return on that capital investment commensurate with the amount of systematic (non-diversifiable) risk of the investment. The tax regime should account for the normal rate of return on the capital before applying any tax.

11. In the case of mineral resource mining in Israel, capital investment may be less meaningful for taxation. One solution, as we explain below is to include ongoing capital expenditures or depreciation when calculating profit margins. An alternative solution is to determine a normal rate of return for the mining industry. In this alternative, the excess profits to be taxed would be those profits that exceed the normal rate of return on a company's investment. As we will illustrate, this can be done on an ex post basis. In other words, the tax could go into effect once the realized return on the firm's capital stock (after depreciation) exceeded a benchmark competitive level.

12. **An illustrative example using profits.** We illustrate the basic concept of an excess profits tax by considering two potash producers, Company A and Company B. Assume that the two producers both receive the worldwide spot price for potash, $300/tonne.[3] Next, assume that extraction costs are $170 per tonne for Company A, and $260 per tonne for Company B. Operating profits, therefore, are:

	Company A	Company B
Price	$300	$300
Extraction Costs	170	260
Operating Profits	130	40

13. Next, consider capital expenditures. On-going capital expenditures are anticipated to be quite minimal, especially as ICL estimates a useful life of approximately 25-40 years for its property, plant, and equipment.[4] For the purposes of this hypothetical discussion, let's assume these capital expenditures, when amortized, are on the order of $10 per tonne for both Company A and Company B. Net income, then, would be:

	Company A	Company B
Price	$300	$300
Extraction Costs	170	260
Capital Expenditures	10	10
Net Profit (before taxes)	$120	$30

14. In this hypothetical example, Company A earns $120 of profit per tonne compared to Company B's profit of $30 per tonne. Company A earns $90 more per tonne than Company B, which has a much higher marginal cost of production. What drives the high level of profitability for Company A is a form of capital – a non-renewable natural resource that belongs to the people in the countries where the resource is developed (e.g., Israel). This resource is, in essence, being "rented" to potash producers while simultaneously being depleted by them.

15. This leads to the question of how to share the profit generated by the natural resource. Companies will demand that they earn at least a competitive profit from their operations; if all of the profit is taken by the government, companies will have no incentive, in this case, to produce potash. Conversely, the government taking none of the profit is equally unsatisfying, given that the capital is owned by the State, not by Company A.

[3] One tonne is 2,000 kilograms, and is sometimes referred to as a metric ton.

[4] ICL, Periodic Report for 2012, p. 155.

16. So how should the portion of profit attributable to the natural resource be divided between the company and the government? One reasonable answer is that the profits of Company A should be limited to a competitive level. What is that competitive level? It might be the net income margin of 10 percent earned by Company B. Or it might be determined by looking at margins for a broad set of mining companies, as we have done in **Figure 1**. The idea is that anything in excess of a competitive profit level should be returned to the state, which owns the resource that makes the profit possible in the first place.

17. Another approach would be to allow the company to earn an "excess" profit, but not too much above the competitive rate, to ensure that the company is able to stay in business, continue to invest as needed, and to expand production if demands increases and/or world supply decreases. How much "excess" profit the company might be allowed to earn could depend on the relative strength of the each party's bargaining position; it could also be affected by political factors.

18. **An illustrative example using rate of return.** In the illustration above, the capital expenditures by Company A and Company B were minimal. But if instead the capital expenditures were much greater, the excess profits tax could alternatively be implemented using a rate of return approach. In the following, we illustrate how such an approach might be implemented using the hypothetical example from above.

19. Imagine that Company A has spent $1 billion in capital expenditures to expand production capacity and to renovate plant equipment.[5] In order to justify the investment, investors in Company A would demand a return on this investment that was commensurate with its systematic risk. If, for example, the appropriate rate of return for capital invested in mining operations were 10 percent, then the investors in Company A would require a return of $100 million annually to compensate them for the investment risk they have taken.

20. Suppose as in our previous example, Company A sold 1 million tonnes of potash with $120 million in profits. The question of how the portion of profit attributable to the natural resource be divided between the company and the government can be answered in reference to the rate of return. The competitive level of profits is measured in this instance as the profits in excess of the competitive rate of return on the company's capital investment.

21. Company A's investors have been compensated for more than the competitive rate of return on their capital which was $100 million. This means that crediting investors the required rate of return of $100 million dollars, Company A would have "excess" profit

[5] In this example, also assume that the $1 billion makes up the entire capital stock of Company A.

of $20 million. As discussed above, this $20 million is attributable to the natural resource, which is owned by the state and can be divided between the company and the government. As above, the relative magnitude of this split could be based on the bargaining positions of the parties or political factors.

22. **Determining Excess Profits.** In the analysis that follows, we examine financial data from ICL and industry sources to measure the profit generated by Israeli mining operations in the extraction and sale of potash, bromine, phosphate, and magnesium. In some cases, as we discuss below in greater detail, it is necessary first to determine an arm's-length price for the mineral, and use that estimate for measuring revenues rather than relying on ICL's reported level of revenues. In each case, we compare ICL's profitability to that of its closest competitors, where the data are available. However, we are mindful that in certain industries, such as potash, cartel-like behavior may yield "excess" industry profits for many of ICL's competitors. Thus, ultimately we compare ICL's profitability to benchmarks covering the broader mining industry. By making these comparisons, we can determine the degree to which ICL's profits have historically exceeded the industry norm.

23. To the extent that ICL is more profitable than other mining companies, and in some cases its close competitors as well, this would suggest that the value of the natural resource capital in Israel exceeds the value of natural resource capital in other countries. Hence, these comparisons enable us to propose a tax rate that, applied to ICL, would bring its profits more in line with competitive levels.

POTASH

24. Potash is a generic term used to describe potassium-bearing minerals and refined products. Potassium is one of three primary nutrients essential for plant growth and together with nitrogen and phosphorous forms the basis for fertilizer production throughout the world.

25. **Major Potash Producers.** Potash production is concentrated in a small number of countries. Canada, Russia, Belarus, Germany, Israel and China provide almost 90 percent of the global potash production.[6] As of 2009, Russia and Belarus were the leading producers and exporters of sylvite (which is potassium chloride in natural mineral form),[7] accounting for more than 56 percent of global production.[8]

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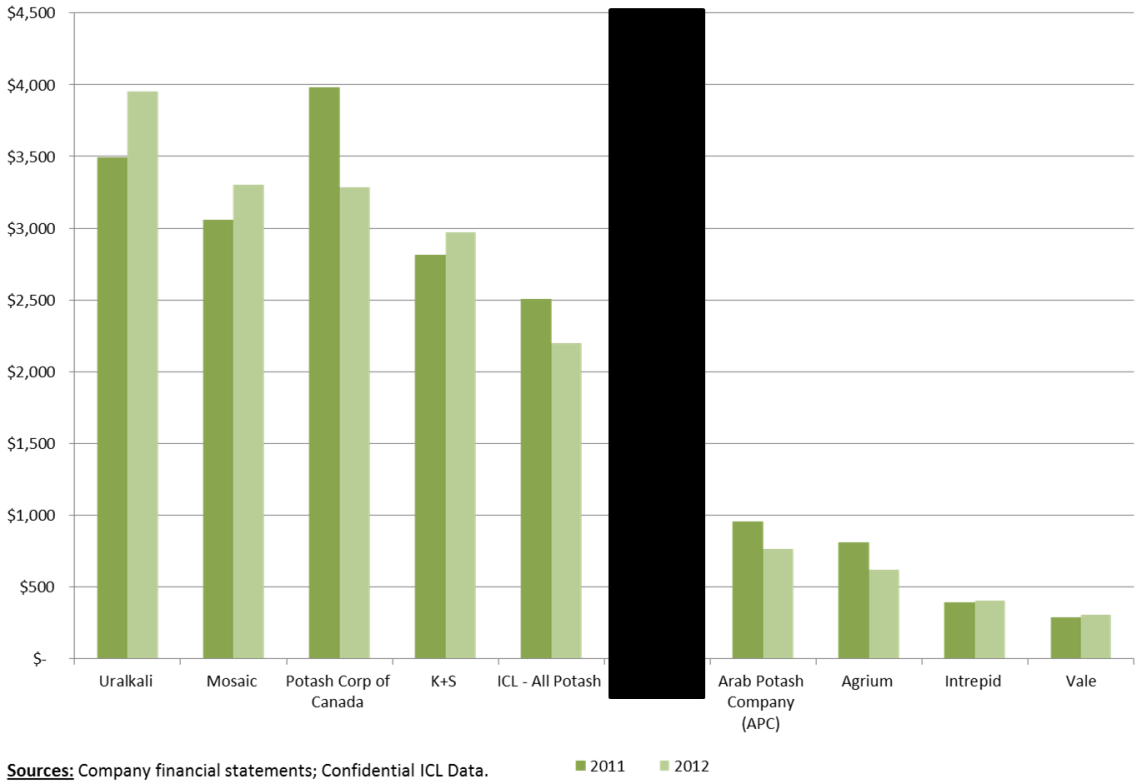
[6] Mineral Planning Factsheet, Office of the Deputy Prime Minister, British Geological Survey: http://www.mauk.org.uk/sites/default/files/public_files/mpfpotash.pdf; Integer Research, Outlook for Potash, Third Edition, p. 31.

[7] Sylvite is the predominant source of potash throughout the world.

[8] Elemental Minerals Limited, Potash Industry: http://www.elementalminerals.com/Projects/Potash.

26. **Figure 2** charts the revenue of the largest potash producers in 2011 and 2012. Data on the financial operations of most of the largest companies is available including prices, costs, royalties for mineral rights, and profitability.[9] These data are analyzed and discussed below.

Figure 2. Potash Segment Revenue (USD Million) by Company, 2011 and 2012

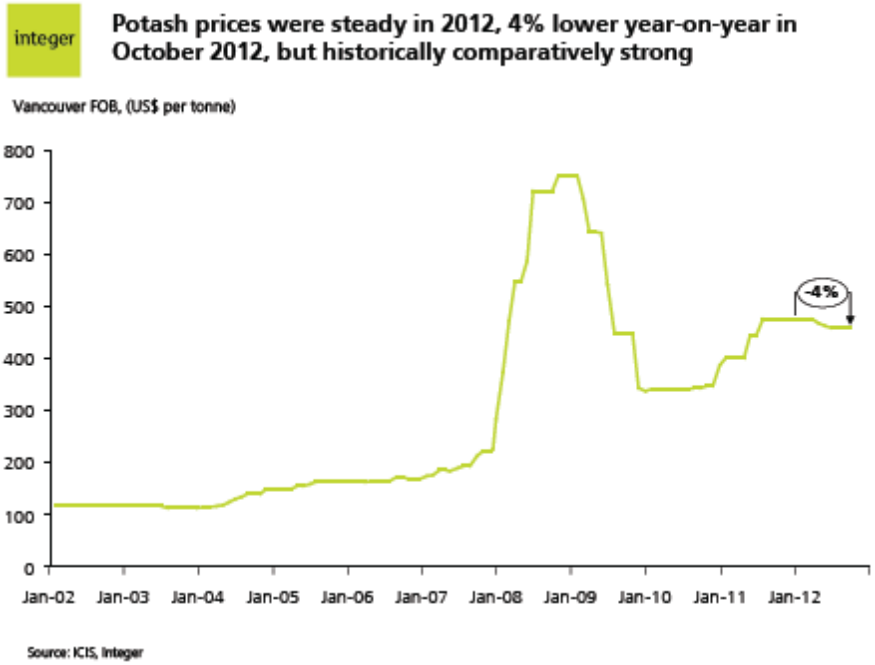


Sources: Company financial statements; Confidential ICL Data.

[9] Data was obtained using publically available financial statements and proprietary data obtained from Integer Research, a business intelligence firm that specializes in the fertilizer industry.

27. **Potash Prices.** The spot market for potash has experienced historic periods of volatility followed by relative price stability. Prices fluctuate with demand, which is driven by crop markets. Tight crop markets and high crop prices increase demand for fertilizer. As **Figure 3** illustrates, the spot market prices spiked in 2008 at about $700 per tonne FOB Vancouver and declined to about $300 per tonne during 2009 following the economic crisis. Prices have since settled at about $450 per tonne.

Figure 3. Potash Prices, 2002 – 2012

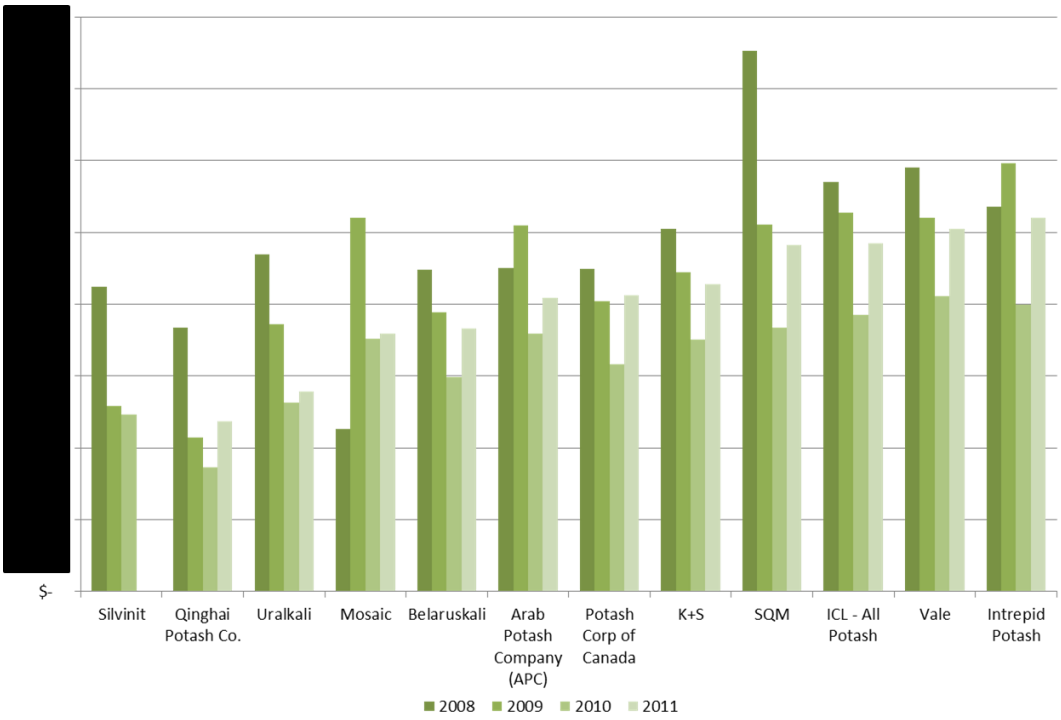


28. Spot prices such as those above reflect current market conditions for short-term transactions. Actual transaction prices may reflect long-term contractual arrangements that will reflect a variety of unique factors. For example, the geographic proximity of potash producers to the markets that they service can provide key logistical advantages which allow them to command a higher price. **Figure 4** compares the average annual prices received by several potash producers from 2008 to 2011, as reported by Integer Research. The prices received by ICL are among the highest in the industry. This is due in large part to a 2011 contract signed with Chinese fertilizer producers, Sinofert and CNAMPGC, to produce 550,000 tonnes of potash at a price of [redacted] per tonne delivered.[10] Israel's geographic proximity to Asian markets affords substantial logistical advantages to ICL, which has allowed it to command higher prices than many of its industry peers. Other producers with similar proximity to key markets also command high prices.

[10] Integer Research, Outlook for Potash, Third Edition, p. 138.

Intrepid has U.S. mines close to the American corn belt region.[11] Vale and SQM produce near high-demand markets in Latin America and Brazil.[12]

Figure 4. Potash industry average prices received ($US per tonne), 2008 – 2011



Source: Integer Research Outlook for Potash, Third Edition, 2013.

29. **Potash Production Costs.** Potash production costs vary widely across the industry and are dependent upon factors such as production techniques and geography, both of which are more associated with the resource itself than with the company extracting it. **Figure 5** illustrates the production costs for potash producers as identified by Integer Research. The lower cost producers gained their benefits from combinations of 1) cheaper energy and labor costs, 2) larger production volumes leading to large operating scale and production efficiencies, and 3) lower extraction costs related to their solution mining techniques (i.e., extraction of minerals from a solution such as brine, as opposed to the more typical mechanical mining of solid minerals).[13]

[11] Integer Research, Outlook for Potash, Third Edition, p. 244.

[12] Integer Research, Outlook for Potash, Third Edition, p. 243.

[13] Integer Research, Outlook for Potash, Third Edition, p. 253- 255. Note that these costs do not include royalties or resource taxes.

Figure 5. Potash industry costs of potash sales ($US per tonne), 2008 – 2011

Notes: Cost items include: materials and components, depreciation, repairs and maintenance, fuel and energy, labor costs, and transport expenses.
Source: Integer Research Outlook for Potash, Third Edition, 2013; ICL Confidential Data.

30. **ICL's Potash Operations**. Sales of potash represent 35 percent of ICL's total revenues.[14] ICL produces potash through operations in three different locations: Sodom, Israel (DSW), Boulby, UK, and Llobreget, Spain. The potash production methods differ across these sites. The potash produced by DSW is based on evaporative extraction of potash from Dead Sea brines, whereas the potash produced in Europe is derived from conventional underground mining.[15] In evaporative extraction, mineral-rich brines from the Dead Sea are pumped into shallow evaporation ponds. Solar energy then evaporates the water, leaving behind the raw potash material. This evaporative extraction of potash is a simple and cost-effective process[16] and does not use any specialized technologies. Thus, one would not expect the production company to earn any excess return from intellectual property.

31. The majority of ICL's potash sales are to third parties. This follows ICL's shift in sales strategy beginning in 2010 to sell directly to fertilizer producers and distributors in China. These customers have entered into a three-year agreement to purchase over three million tonnes of potash from ICL.[17]

[14] Integer Research, Outlook for Potash, Third Edition, p. 134.

[15] Integer Research, Outlook for Potash, Third Edition, p. 135.

[16] ICL, Periodic Report for 2012, p. 12.

[17] GLOBES, Israel Chemicals Signs Chinese Potash Deals: http://www.globes.co.il/en/article-1000815218.

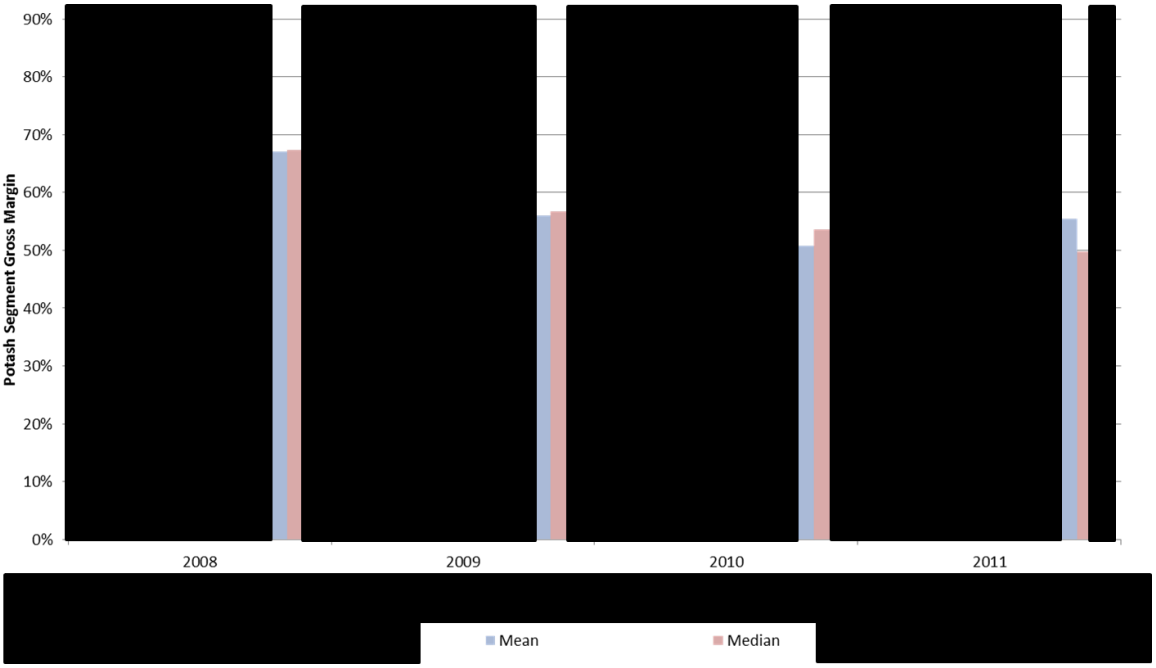
32. **ICL Potash Profitability.** ICL provided profit and loss data to the Second Sheshinsky Committee for each of its separate operations ("P&L data"). **Exhibit 2** shows the P&L data for ICL's DSW potash operations. The P&L data include a breakdown of the revenues by region and type of customer. In 2012 and 2013, more than [redacted] percent of all ICL potash sales were to unrelated customers outside of Israel and another [redacted] percent were to unrelated customers within Israel. The remainder of ICL's potash sales was made to related parties either within or outside of Israel. Sales to third parties represent arm's-length transactions, and thus typically provide reliable measures of value. Intercompany sales are often made at a transfer price that is substantially less than the market price. In the case of potash, the sales made to other ICL subsidiaries were made at prices similar to the third party sales. As well, the prices reported for these third party sales can be corroborated through publicly-available market data as discussed above. Therefore, there is little concern that the revenues reported by ICL for its potash operations distort the true market value.

33. The DSW potash segment is highly profitable. Gross margins (revenues less mining and processing costs, and after subtracting royalties to the Israel government) have ranged from [redacted] percent to [redacted] percent during the 2005 to 2013 time period. Net profit margins (after royalties and corporate income tax) ranged from [redacted] to [redacted] percent of revenue. Over the same period, the Government Take, including income taxes, and royalties, ranged from [redacted] percent to [redacted] percent of revenues. (See **Exhibit 2**.)

34. ICL-DSW potash segment prices are among the highest in the industry while production costs are close to average. **Figure 6** compares the gross margins of various potash producers. The data for this analysis was obtained from Integer Research and reflects profit margins calculated by subtracting all mining and processing costs including labor, transportation costs, and any royalties/resource taxes.[18] Costs not included are administrative overhead which, at least in the case of ICL is small, and corporate income taxes. At this profit level, ICL's overall potash segment and its DSW operations is in the top half of the range of major producers from 2008 to 2011.

[18] Cost of sales includes: materials and components, depreciation, repairs and maintenance, fuel and energy, labor costs, transport expenses, and royalties and resource taxes.

Figure 6. Potash Producer Profitability Comparison (per Integer Research), 2008-2011



35. As an alternative measure of profitability, we examine the public financial records of various large potash producers. (See **Exhibit 3**.) We calculate gross margins by subtracting mining and processing costs but not depreciation or transportation costs from revenues. We calculate operating margins by subtracting all mining and processing costs as well as all selling, general and administrative overhead expenses. From 2008 to 2012, both the gross margins and operating margins of ICL's DSW operations are among the highest in the industry.

BROMINE

36. Bromine occurs in seawater as a sodium salt. It is recovered commercially through the treatment of seawater with chlorine gas, in which the liquid, elemental bromine forms from the oxidation of bromide ions.[19] Elemental bromine is used to manufacture a range of bromine-containing compounds that are used for industrial and agricultural applications. The most common applications of bromine include brominated flame retardants, fumigants, water purification compounds, dyes, medicines, and disinfectants. In 2012, approximately half of the global supply of bromine was sourced from the Dead Sea.[20]

[19] Hirayama, Y., "ICL – Global Bromine Industry and its Outlook," May 9, 2008, p. 4.

[20] See, ICL, Periodic Report for 2012, p. 59; Minerals Education Coalition, Bromine: http://www.mineralseducationcoalition.org/minerals/bromine.

37. **Major Bromine Producers**. The U.S. and Israel are the world's two top sources of elemental bromine. ICL is the world's largest bromine producer, with approximately 40 percent of the global production capacity.[21] The next largest producer, Albermarle, is located in Arkansas, where elemental bromine is derived from deep brine wells.[22] Other large bromine producers include U.S.-based Chemtura, and Gulf Resources, China's largest producer and local distributor of elemental bromine and crude salts.[23]

38. **ICL's Bromine Operations**. The concentration of bromine in the Dead Sea is significantly higher than the concentrations in regular sea water, which, according to ICL, provides ICL with a competitive advantage.[24] According to ICL, this high concentration makes bromine production in the Dead Sea the "easiest, most economically feasible and stable in the world."[25] Additionally, the chlorine used for this process is a by-product of the magnesium electrolysis process at ICL's Dead Sea Magnesium ("ICL-DSM") segment, which offers further cost advantages.[26]

39. **Exhibit 4** shows the P&L data produced by ICL for its bromine operations. From 2005 to 2013, net income margins were approximately [redacted] percent to [redacted] percent, with the exception of 2009 in which a large amount of "Other Income" increased the percentage to [redacted] percent. These profitability levels are consistent with a resource-based competitive advantage in the extraction of bromine from highly concentrated Dead Sea brines.

40. A significant portion of elemental bromine produced by ICL-DSB is sold within ICL to divisions engaged in the production of bromine compounds (such as flame retardants).[27] As discussed above with respect to potash, when ICL sells a product from one ICL company to another, the internal price may not reflect the market price. In the case of potash, because those internal sales were a small percentage of overall sales and because they appear to be at prices similar to prices used for third party sales, we made no adjustment to internal prices in our analysis.

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[21] ICL, Industrial Products: http://www.icl-group.com/aboutiicl-segments/General/db6b0d57-1180-47a2-9624-35fefb085b44.aspx.

[22] See, Seeking Alpha, Gulf Resources – A compelling Opportunity in the Bromine Market: http://seekingalpha.com/article/254027-gulf-resources-a-compelling-opportunity-in-the-bromine-market.

[23] See, Gulf Resources, Overview: http://www.gulfresourcesinc.com/about.html.

[24] For example, ICL internal estimates show that the concentration of bromine in the Dead Sea can be anywhere from 2 to 20 times greater when compared to other sources. See ICL, Periodic Report for 2012, p. 59.

[25] ICL, Periodic Report for 2012, p. 59.

[26] ICL, Periodic Report for 2012, p. 68.

[27] Bromine compounds are manufactured through ICL's Industrial Products segment, "ICL-IP."

41. However, in the case of bromine, between [redacted] percent and [redacted] percent of the elemental bromine produced by ICL (on a tonnage basis) is sold within ICL. From our analysis of the profit and loss statements provided by ICL, we can see that the transfer prices at which these sales are made are lower than the prices at which the elemental bromine was sold by ICL to third parties. Revenues in 2012 from sales to ICL companies account for only [redacted] percent of the total revenues, despite the fact that these sales account for 76 percent of the total volume of elemental bromine produced, according to ICL's annual reports.[28] The significant volume of sales at transfer prices that do not reflect the market price distorts the profitability shown in the ICL-DSB profit and loss statements.

42. To properly assess profits that are earned by ICL from the extraction and sale of elemental bromine, we must first make adjustments to the revenues to reflect the market value of the elemental bromine. We discuss these adjustments and the resulting profitability in the next section.

43. **ICL Bromine Profitability**. To estimate the appropriate price of elemental bromine for ICL sales, we employ methods commonly used in transfer pricing, namely using observed arm's-length prices charged by ICL-DSB to third parties.

44. **Exhibit 5** shows our analysis of prices and the calculation of adjusted revenues that reflect market prices. We rely on data provided by ICL. These data show quantities and prices for sales to external customers and internal customers. In order to adjust the revenues to reflect the true market value of the elemental bromine, we multiply the volume of tonnes sold to both internal and external customers by the price per tonne at which elemental bromine was sold to external customers. The adjusted revenues greatly exceed those reported in ICL's P&L statements. For example, ICL's P&L statement reports that ICL earned [redacted] in revenues from the sale of elemental bromine in 2012. After applying the third-party price to all sales, we calculate revenues of [redacted].

45. We believe this adjusted revenue of [redacted] is the appropriate starting point for an analysis of profitability as compared to the reported [redacted] of revenue that appears in the P&L data for 2012. **Exhibit 6** makes this replacement for every year and recalculates the profit using these adjusted revenues. Using this proposed measure of revenues yields substantially higher profit margins. Gross margins (including depreciation expense) range from [redacted] percent to [redacted] percent, and operating income margins range from [redacted] percent to [redacted] percent.[29]

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[28] ICL, Periodic Report for 2012, p. 17.

[29] In some years, Other Income is very large relative to Sales. I do not have any information on the nature of this income. For purposes of computing Operating Margin, I have not included this Other Income. Including it would cause the Operating Margin to exceed 100 percent in 2009.

46. As a further check on the analysis, we were able to obtain profitability data for one other bromine producer, Gulf Resources. Gross profit margins for Gulf Resources' Bromine segment were 26 percent and 48 percent for 2012, and 2011, respectively.[30] The higher margins realized by ICL is consistent with ICL's assertions that it enjoys significant cost benefits relative to the competition.

PHOSPHATE

47. Phosphate rock is used in the manufacture of phosphoric acid and fertilizers and can also be used as direct application fertilizer.[31] The term phosphate rock is a general term referring to rock with high concentrations of phosphate minerals. The most common source of phosphate rock is phosphorite, which is a marine sedimentary deposit that is typically mined through conventional extraction methods.[32] The raw extracted rock is then crushed and processed to mechanically remove impurities, such as clay and sand, prior to sale.[33] Derivative products of phosphate rock include phosphoric acid, diammonium phosphate (DAP), monoammonium phosphate (MAP), and trisodium phosphate (TSP).

48. **Major phosphate producers.** According to ICL's 2012 Annual Report, "the phosphate fertilizer market is characterized by a relatively large number of competitors, including government companies. The ability to compete in the market is dependent mainly on production costs, product quality and logistics."

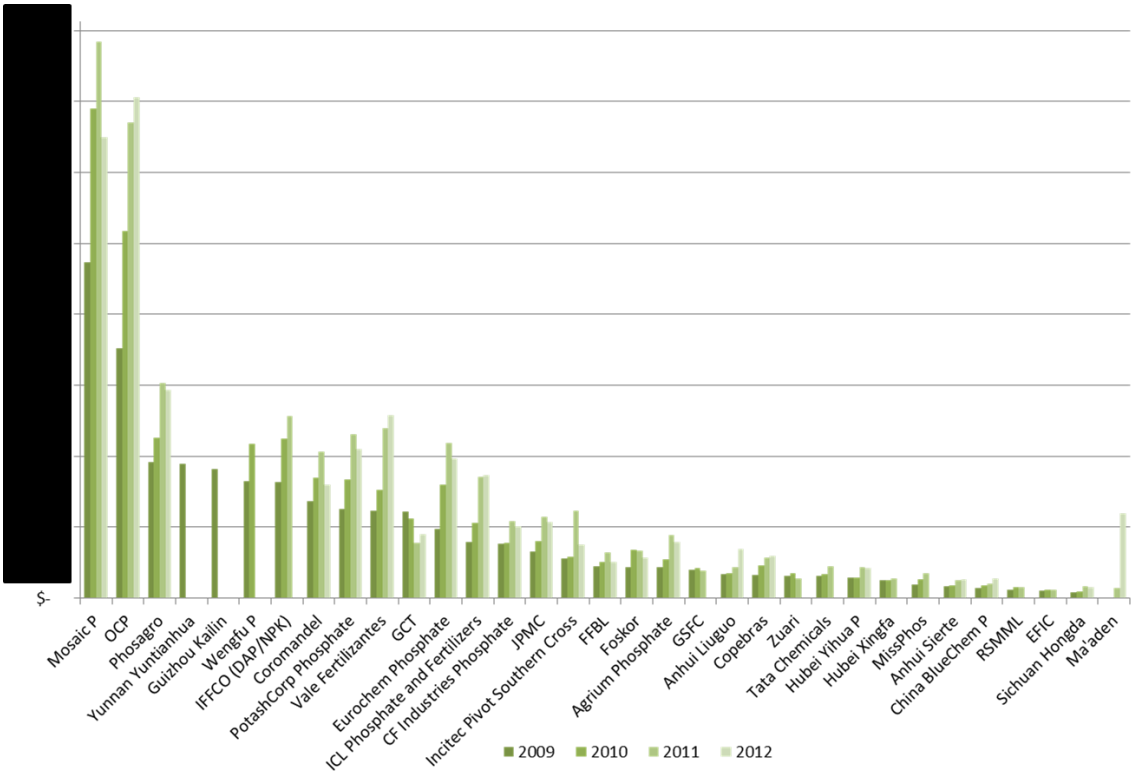
[30] Gulf Resources, Inc. Form 10-K, December 31, 2012, p. 42.

[31] ICL, Periodic Report for 2012, p. 42.

[32] See, Australian Atlas of Minerals Resources, Mines & Processing Centres, Phosphate: http://www.australianminesatlas.gov.au/aimr/commodity/phosphate.html.

[33] See, Florida Industrial and Phosphate Research Institute, Phosphate Primer, http://www1.fipr.state.fl.us/PhosphatePrimer/0/A5C0D8B8CC35F64D85256F790066A89A.

Figure 7. Phosphate segment revenues by company ($US million), 2009-2012



Source: Integer's Phosphate Cost and Profit Margin Service, Issue 3.

49. **Figure 7**, above, charts the revenue of the largest phosphate producers in 2009 to 2012 from the sale of phosphates and derivative products. In each of the four years shown, the three largest phosphate producers by revenue were Mosaic (United States), OCP (Morocco), and Phosagro (Russia). Unlike the potash industry, which is dominated by few competitors, the phosphate industry is far more fragmented, with a long tail of smaller producers.[34] In terms of revenues, ICL's fertilizer and phosphate segment ranks in the middle among this group of producers.

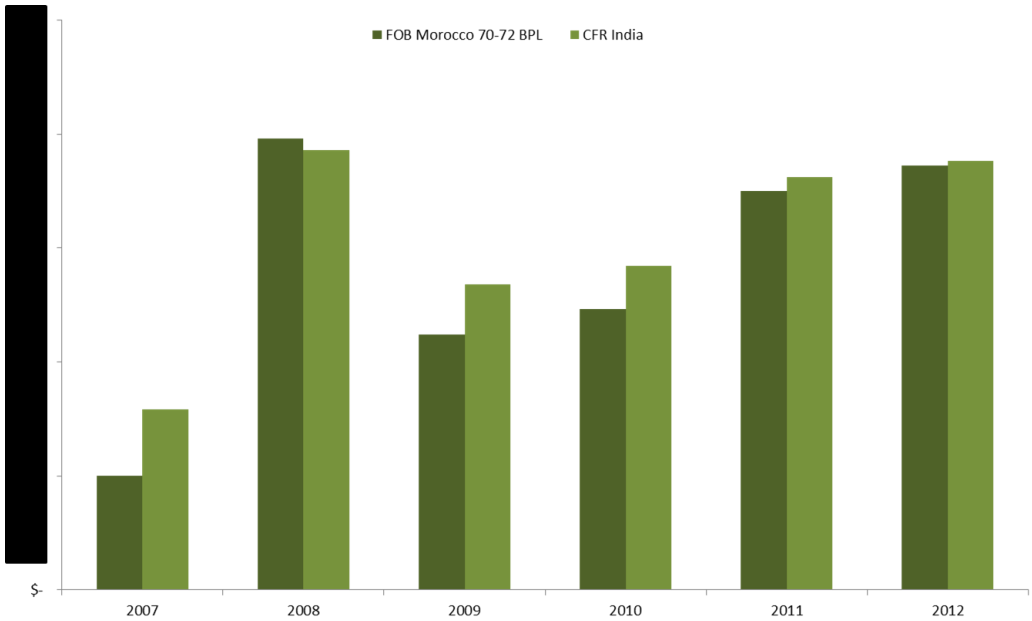
[34] ICL, Periodic Report for 2012, p. 44.

50. **Phosphate prices.** Price references are available for both phosphate rock and certain phosphate derivative products. The main price references are for phosphates sold Free on Board (FOB) or Cost and Freight (CFR):[35]

- phosphate rock, FOB Morocco
- phosphoric acid, FOB Morocco or North Africa, and CFR India
- diammonium phosphate (DAP), FOB US Gulf
- monoammonium phosphate (MAP), FOB Baltic Sea[36]

51. **Figure 8** contains a summary of average international prices for phosphate rock and **Figure 9** contains a summary of the average international prices for phosphate derivatives, from 2007 to 2012. Phosphate rock prices have ranged from [redacted] per tonne to [redacted] per tonne over this period.[37] Phosphate derivative prices have ranged from approximately [redacted] per tonne to [redacted] per tonne.

Figure 8. Average international phosphate rock prices ($US per tonne), 2007-2012



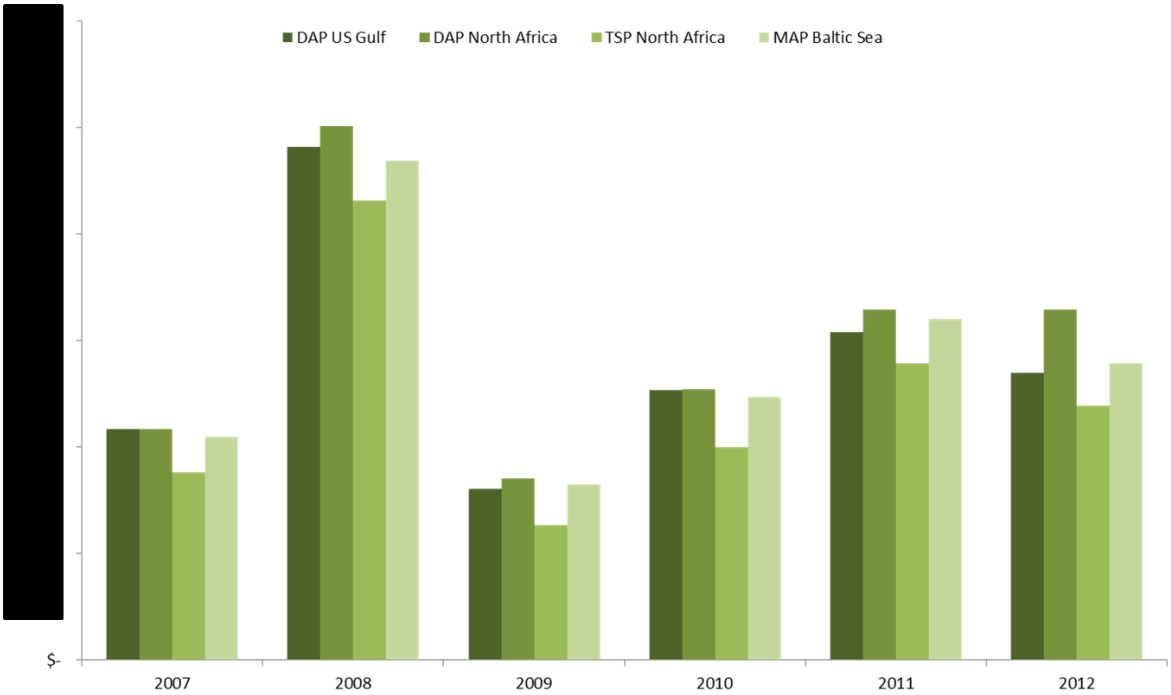
Source:
Integer's Phosphate Cost and Profit Margin Service, Issue 3, Table 28.

[35] Free on Board (FOB) indicates that all costs and risks are passed to the buyer once the cargo is loaded onto the vessel; the buyer pays all costs to deliver the goods to the port of destination. Cost and Freight (CFR) indicates that the title and risks are passed to the buyer once the cargo is loaded onto the vessel, but the seller pays all costs to deliver the goods to the named port of destination. CFR prices are typically higher because the seller bears more costs. This was the case in every year except 2008, which was an anomalous year in which prices more than doubled.

[36] Integer Research, Phosphates Costs and Profit Margin Service, Issue 3, p. 135.

[37] In some instances, FOB Morocco prices may exceed or approach the CFR India price due to differences in quality.

Figure 9. Average international phosphate prices ($US per tonne), 2007-2012



52. ICL's prices per tonne as implied by the P&L statements data appear to be consistent with these prices, except for 2008, when ICL's price of [redacted] per tonne is considerably higher than the CFR India spot price, which falls below [redacted] per tonne.

53. **ICL's Phosphate Operations.** The ICL Fertilizers segment is vertically integrated in its phosphate production. ICL Fertilizers operates phosphate rock mines in the Negev region of Israel through the subsidiary ICL's Rotem Amfert Negev Ltd. ICL Fertilizers uses the phosphate rock it mines predominantly for the production of phosphate fertilizer, which it sells alongside its potash products.[38] Approximately [redacted] percent of the volume of phosphate rock mined by ICL is sold in raw form, while the remainder is processed by ICL, within and outside Israel; final products include phosphoric acid, TSP, and MAP.[39]

[38] ICL, Periodic Report for 2012, pp. 14, 17.

[39] ICL, Periodic Report for 2012, p. 42.

54. ICL believes that the vertical integration gives it a relative advantage with respect to manufacturing most phosphate fertilizers over those manufacturers who must purchase phosphate rock from external suppliers.[40]

55. The sales of phosphate rock reported in the Sheshinski P&L statements include sales to third parties as well as sales to ICL companies. We compared the average price at which the rock is sold to ICL companies to the average price at which the rock is sold to third parties. In all years, the prices charged to ICL companies appear similar to prices charged to third parties. For example, in 2012 phosphate rock was sold to ICL companies outside of Israel at an average price of [redacted] per tonne, while the average price charged to third parties was [redacted] per tonne. As discussed above, the prices implied by these P&Ls are consistent with spot prices. Therefore, we do not believe that any adjustment to prices is needed.

56. **ICL Phosphate Profitability.** Data contained in P&L statements provided by ICL to the Second Sheshinksi Committee indicate *negative* gross margins, *negative* operating margins, and *negative* net margins for its phosphate rock operations. See **Exhibit 7.** However, there is an inconsistency between the sales volumes and the production volumes reported on these statements that is currently unexplained and that could be artificially creating these losses.

57. We use the year 2012 as an example to explain the issue. In 2012, ICL reported sales of [redacted] tonnes. However, the quantity listed under "cost of sales and services" is [redacted] tonnes. According to ICL's annual report, in 2012 ICL produced approximately 3.5 million tonnes of phosphate rock, consistent with the latter number from the P&L statements. We believe that the difference of approximately [redacted] tonnes is being used by Rotem Amfert Negev in the fertilizer business, but that the transfer revenue is not reported here for some reason. We note that there is a column in the Sheshinski P&Ls reporting [redacted] of revenue labeled "Rotem Amfert Negev Other" column. We believe this column includes sales of phosphate derivative products and likely accounts for some or all of the missing tonnes. Below, we present an analysis of revised profitability under the assumption that the Sheshinski P&Ls are reporting costs that reflect a greater production volume than the revenues. This assumption should be confirmed before relying on this analysis. However, we do corroborate our results through a comparison to competitor's profitability, which we present in the following section.

58. **Exhibit 8** shows the P&L data on a per tonne basis using different per tonne quantities for sales and production. We use the year 2012 to explain the analysis. We start by computing an average price of [redacted] per tonne (i.e., [redacted] of Total Revenue divided by [redacted] tonnes). We compute an average cost of sales and services of [redacted] per tonne using the

[40] ICL, Periodic Report for 2012, p. 45.

total cost of [redacted] and dividing by the quantity of [redacted] tonnes listed on the same row of the P&L.

59. We next consider the selling and other expenses. Here we make the assumption that the [redacted] of "selling expenses" pertains specifically to the [redacted] tonnes sold as shown on the P&L. Therefore we divide the selling expense (and all other expenses such as administrative expenses) by [redacted] tonnes. (Note that our treatment is a conservative assumption. If these expenses are more appropriately incurred for the entire volume of production then costs would be lower on a per tonne basis and profits would be higher.)

60. Subtracting costs per tonne from revenue per tonne results in income before tax of [redacted] per tonne, or [redacted] percent of revenues.[41] Gross profits (equal to revenue minus cost of sales) are [redacted] per tonne, or [redacted] percent of revenues, and net profits are [redacted] per tonne ([redacted] per tonne minus [redacted] per tonne of tax expenses, or [redacted] percent or revenues).

61. These results are corroborated by third-party research firm Integer Research. Integer Research estimated that in 2012, ICL was able to achieve a price of [redacted] per tonne (our estimate above is [redacted] per tonne). Additionally, as seen in **Figure 8** above, international phosphate rock prices in 2012 were about [redacted] per tonne. Integer also estimated that ICL's costs were on the order of [redacted] per tonne (our estimate, including selling expenses, is [redacted] per tonne).

62. Applying the same approach from 2008 – 2012 generates net income margins ranging from [redacted] percent to [redacted] percent. See **Exhibit 8**. The considerable range stems from the variability in prices, which range from a high of [redacted] in 2008 to a low of [redacted] in 2010, with little variation in costs of production over the same period.

63. **Comparison of ICL to Competitors**. In **Exhibit 9**, we compare the profit margins of various phosphate producers. It is important to note that these data reflect the profitability of all phosphate products produced and sold by these companies, which is likely to be considerably broader than phosphate rock. The data for this analysis was obtained from Integer Research and reflects profit margins calculated by subtracting all mining and processing costs including labor, transportation costs, and any royalties/resource taxes.[42] Costs not included are administrative overhead which, at least in the case of ICL is small, and corporate income taxes. At this profit level, ICL's overall phosphate segment is in the top half of the range of major producers from 2009 to 2012.

[41] While the P&L also includes revenue and costs for "Rotem Amfert Negev Other," we believe that the revenues associated with this category represent revenues for derivative products.

[42] Cost of sales includes: materials and components, depreciation, repairs and maintenance, fuel and energy, labor costs, transport expenses, and royalties and resource taxes.

64. Focusing on the profitability of ICL's Rotam Amfert Negev Ltd. phosphate rock operations reveals that, with respect to unprocessed phosphate rock, ICL's profitability is well above average. In fact, in 2012, the gross margin for phosphate rock produced from the Negev operation was higher than that of any of the producers listed, including that of ICL's broader phosphate segment (which also includes phosphate derivatives).

MAGNESIUM

65. Magnesium is one of the lightest structural metals in existence. It is valued for its high strength to weight ratio, even when compared to steel and aluminum. It is primarily used as an alloy additive in the manufacture other metals and to produce parts for the automotive industry.[43]

66. **ICL's Magnesium Operations.** ICL's Dead Sea Magnesium (ICL-DSM) deals in the production, marketing, and sale of pure magnesium metal and magnesium alloys.[44] They are the only known producer of pure and alloy magnesium in Israel and accounted for 3.3 percent of the world magnesium production outside of the U.S. in 2010.[45]

67. The ICL-DSM facilities are integrated into the ICL industrial complex in the DSW.[46] The basic raw material for magnesium production, magnesium chloride salt, is supplied by ICL's neighboring DSW operations as a by-product of potash processing.[47]

68. Pure magnesium metal ingots are produced by the electrolysis of the magnesium chloride salts. Chlorine gas, which is a by-product of the electrolysis process, is separated and sold to ICL-IP as an input material for the production of elemental bromine.[48]

69. **ICL Magnesium Profitability.** The P&L statements provided by ICL indicate that the vast majority of revenue on the sale of magnesium products is to third-party customers outside of Israel. (See **Exhibit 10**.) For example, in 2012, total revenues for ICL-DSM

[43] ICL, Periodic Report for 2012, p. 89.

[44] ICL, Periodic Report for 2012, p. 89.

[45] International Trade Commission, Investigation No 731-TA-895 (Second Review), Pure Magnesium (Granular) from China, September 2012, I-57.

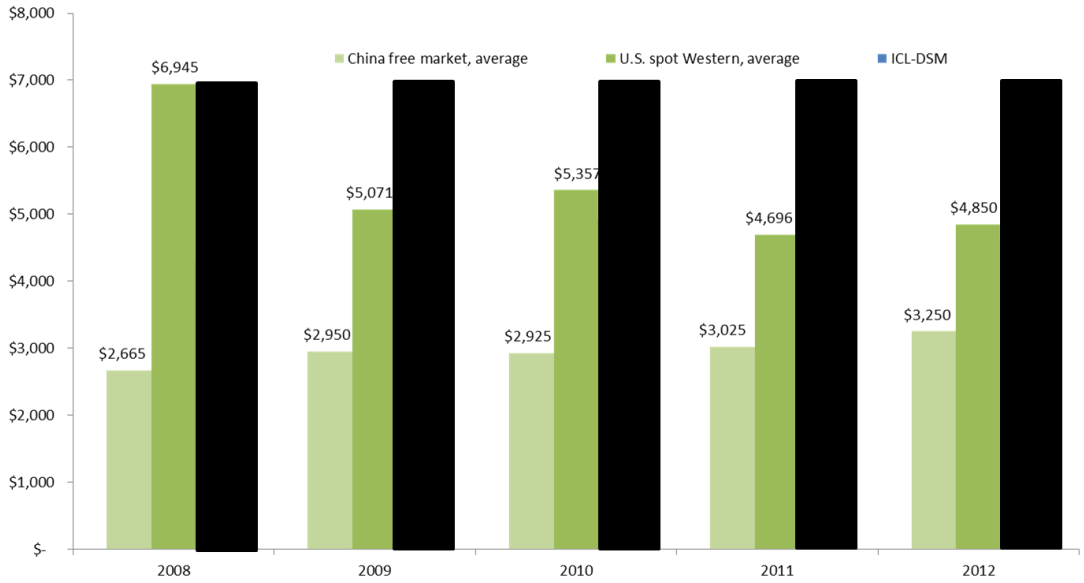
[46] International Magnesium Association, Dead Sea Magnesium: http://www.intlmag.org/about/CompanyProfile.cfm?urlid=Ii0iWCAK.

[47] ICL, Other, Dead Sea Magnesium Ltd.: http://www.icl-group.com/aboutiicl-segments/General/62f89ab2-8cc4-4d1e-b075-664c734e6911.aspx.

[48] ICL, Periodic Report for 2012, p. 68.

were [redacted], with [redacted] attributed to the sale of [redacted] tonnes of magnesium outside of Israel to other companies. This is consistent with 2011 statistics reported by the U.S. International Trade Commission (ITC), indicating that 84.5 percent of all imported magnesium metal ingots in the U.S. were imported from Israel (corresponding to about 15 thousand tonnes).[49] The price per tonne of magnesium implied by the P&L is consistent with market prices. **Figure 10** provides the year-end price of magnesium metal from 2008 to 2012, as reported by the U.S. Geological Survey. For each year, the average price implied in ICL-DSM's P&L statement is consistent with prices in the U.S. spot market as one would expect given that such a large volume of ICL magnesium is exported for sale to the U.S. market.

Figure 10. Magnesium metal prices ($US per tonne), 2008-2012



Note:
ICL-DSM's price reflects the average annual price received for sales to others, outside of Israel, as indicated in ICL-DSM's P&L statement.

Source:
Magnesium Metal, USGS 2013 Yearbook, p.1; Confidential ICL Data.

70. The 2012 P&L statement also indicates an additional [redacted] in revenue from sales to other ICL companies. However, there is no volume recorded for these sales. Presumably, these revenues correspond to the intercompany sales of chlorine gas (a byproduct of the electrolysis of magnesium chloride) to ICL-IP; however this is not explicitly stated in the P&L statement. We are unable to determine from the information we have whether or not these sales were done at an internal transfer price below market value. Without additional information, we cannot make any adjustments to this revenue as

[49] International Trade Commission, Investigation No 731-TA-895 (Second Review), Pure Magnesium (Granular) from China, September 2012, I-57.

we did with bromine.

71. Margins on ICL's production of magnesium are substantially lower than for potash, phosphate, or bromine. As **Exhibit 10** shows, from 2008 to 2012, both operating and net income margins on ICL-DSM's magnesium sales range from [redacted] percent to [redacted] percent, with gross margins ranging from [redacted] percent to [redacted] percent.

72. There is the possibility of cost allocation issues in ICL-DSM's P&L statement. The raw magnesium chloride used to manufacture magnesium metal is generated as a byproduct of the production of potash. Insofar as ICL-DSM obtains its raw magnesium chloride from the DSW potash operations, it is possible that the price paid by ICL-DSM for the raw magnesium was below its fair market value. An increased raw material price, however would only serve to reduce ICL-DSM's already low profitability even further. It is also possible that ICL-DSM bears some portion of the potash production costs that serve to lower its profitability. Without additional information, we cannot make adjustments to these costs.

ICL PROFITABILITY RELATIVE TO COMPETITIVE LEVELS

73. In the previous sections, we have analyzed ICL's financial data for four products, potash, bromine, phosphate, and magnesium, and adjusted them as necessary to determine the profitability that reflects the value of the underlying resource free from intercompany transfer pricing biases. From these analyses, we conclude ICL's profit levels are very high for three of the four minerals, and where we can compare them against profit margins for other producers of the same minerals, they are higher than the average producer.

74. The fact that ICL's profit margins are higher than the average margins for other producers of the same minerals reveals that ICL is not the marginal cost producer. This fact at a minimum shows that the Government Take in Israel can be increased without putting ICL at a competitive disadvantage relative to the other producers of the same minerals. But comparing ICL's profits against other producers of the same mineral may include supra-competitive profits specific to that mineral, such as those resulting from cartel pricing.[50]

75. As such, it is more appropriate to consider the profit margins for these minerals against benchmarks that are free from these factors that increase profit margins. To do so, we propose analyzing ICL's profitability against a broader average of mining company

[50] Competitive profits observed in potash industry are greatly influenced by Canadian and Russian producers, which control the two main potash export cartels. See, *The New York Times*, Collusion in the Potash Market, September 13, 2013: http://www.nytimes.com/2013/09/14/opinion/collusion-in-the-potash-market.html?_r=0.

profits. This broader average will more accurately reflect the competitive profit margin required for a mining and minerals company to remain in business.

76. Therefore, we further refine our comparability analysis by focusing on the industry groups that are most relevant to the operating activities of ICL's DSW business groups, which primarily relate to the mining and quarrying of minerals along with other well and brine operations. These include the groups of comparable companies listed in the SIC Code 1400,[51] Mining and Quarrying of Non-Metallic Materials industry group, which is comprised of 29 companies, and Compustat's Metals and Mining industry group,[52] which is comprised of 700 companies.

77. In order to examine the central tendency for the profitability measures among these comparable groups, we remove the effects of any outliers by calculating the interquartile range of profitability for each comparable group (25^{th} to 75^{th} percentile) as well as the interquartile average. This practice is commonly used in transfer pricing analysis in order to determine an arm's-length range of figures for profitability. Such statistical tools help to enhance the reliability of the analysis, given that the process used for selecting comparable firms and limitations in information available on comparable firms means that some comparability defects remain that cannot be identified and/or quantified, and are therefore not adjusted (often the case when comparable firms are selected from a database).[53]

78. **Exhibit 1** compares the gross margin, operating margin, and net income margin of ICL's various mining operations against the interquartile average profits for mining industry comparable companies. **Figure 11**, **Figure 12**, and **Figure 13** present the information graphically for 2012.

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[51] According to the U.S. Occupational Safety & Health Administration, "[t]his major group includes establishments primarily engaged in mining or quarrying, developing mines, or exploring for nonmetallic minerals, except fuels. Also included are certain well and brine operations, and primary preparation plants, such as those engaged in crushing, grinding, washing, or other concentration." Specifically, this group contains companies engaged in the mining of fertilizer minerals such as potash and phosphates."
See, United States Department of Labor, Occupational Safety & Health Administration: https://www.osha.gov/pls/imis/sic_manual.display?id=9&tab=group.

[52] Compustat's comparable companies list is derived from the proprietary GICS classification, offered by Standard & Poor's. The GICS methodology has been commonly accepted as an industry analysis framework for investment research, portfolio management and asset allocation. This group selects comparable companies from a range of mining sub-industries, including, aluminum mining, diversified metals and mining, and precious metals and minerals.
See, Standard & Poor's, Global Industry Classification Standard (GICS): http://www.mas.gov.sg/~/media/resource/legislation_guidelines/insurance/notices/GICS_Methodology.pdf.

[53] See, OECD Secretariat Paper on Arm's Length Range, 2010: http://www.oecd.org/ctp/transfer-pricing/45765058.pdf.

Figure 11. Industry group gross margin comparison – 2012

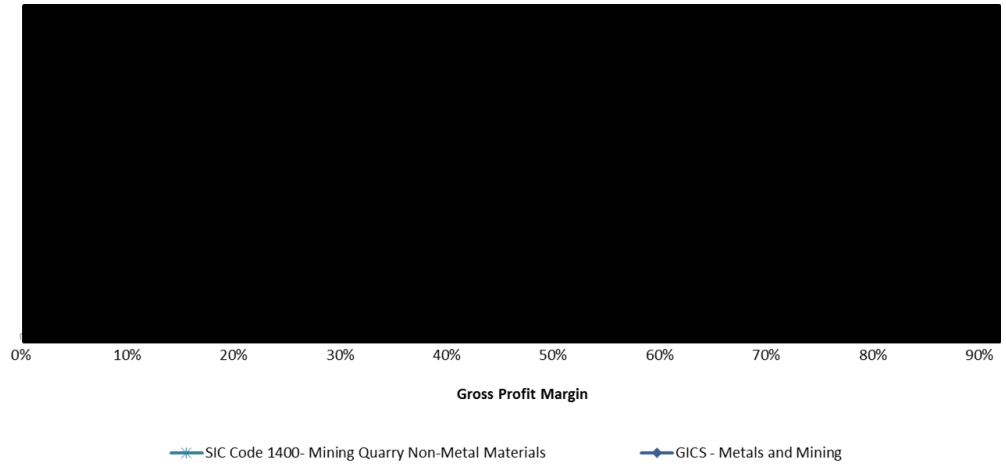


Figure 12. Industry group operating margin comparison – 2012

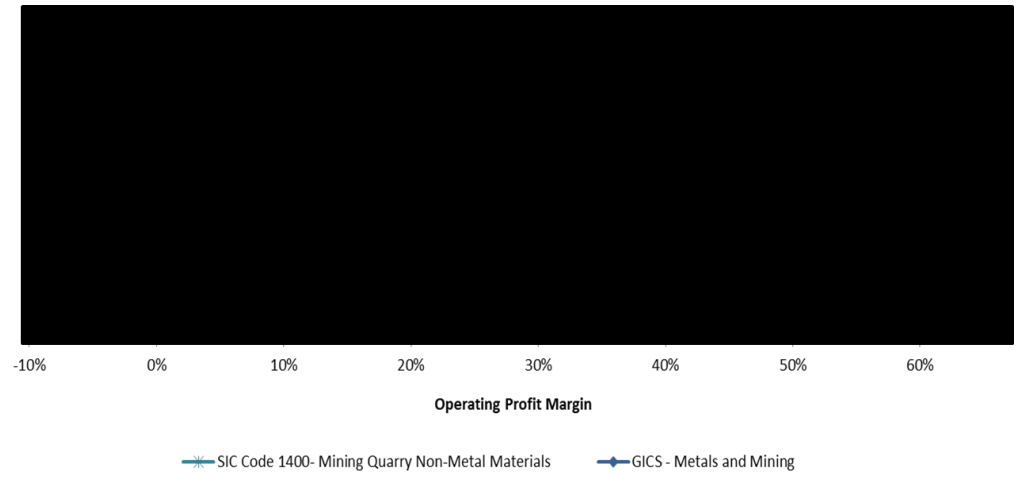
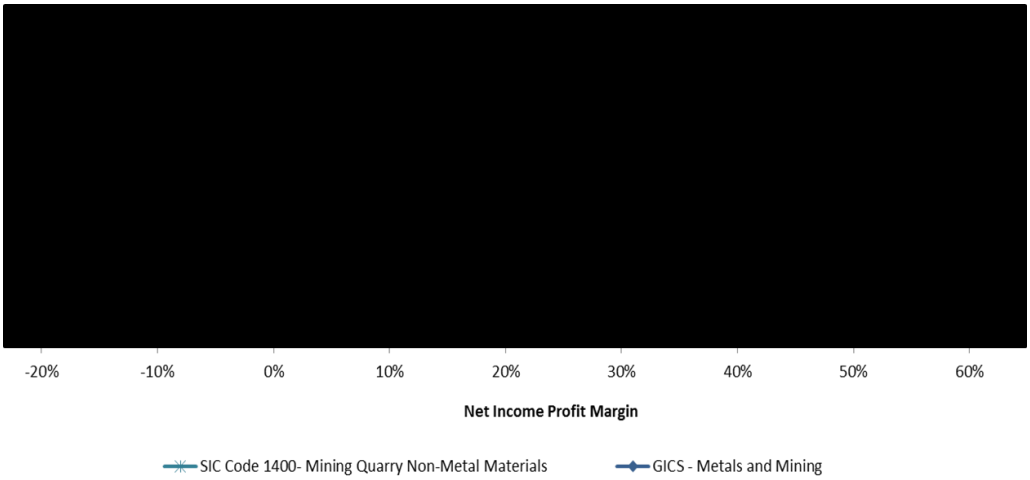


Figure 13. Industry group net income margin comparison – 2012



79. In 2012, operating profits from ICL's DSW potash, bromine, and phosphate rock operations far exceeded the levels of even the highest earning companies (i.e., the 75th percentile) in mining industry groups, while the profits for ICL's magnesium operations were generally within the interquartile range of the comparable companies. See **Figure 12**. Similar patterns are observed for gross profit and net income margins. See **Figure 11** and **Figure 13**.

DO SUPER-COMPETITIVE PROFITS IMPLY A HIGH RATE OF RETURN?

80. The fact that we found super-competitive profits for certain of ICL's DSW operations does not imply that ICL's rate of return, or cost of capital, is higher than that of firms earning a competitive level of profits. *It is important not to confuse the concept of high profitability with a high rate of return.* They are separate ideas.

81. FTI Consulting, in its report to the Second Sheshinski Committee, concluded that "the rates of return on ICL shares… are similar to (but slightly lower than) ICL's largest public sector competitor (PCS). Thus it does not appear that ICL's shareholders… realized "super" profits or excess returns over this period."[54] This is absolutely wrong. FTI Consulting may be completely confused. In any case, its report is highly misleading. We will show that ICL's cost of capital is approximately 13 percent on a pre-tax basis, which is consistent with the normative range for the mining industry, which we find to be approximately 11 to 15 percent. However, *in no way does this suggest that ICL's profits are not super-competitive*.

82. High levels of profitability, such as those enjoyed by ICL, are built into the level of capitalization of the business. That is, ICL's share price (and thus the value of the firm) reflects its high profit rate. The high profit rate gives the firm a high value, but it *does not imply that the rate of return to shareholders will be unusually high*.

83. A rate of return reflects the *change* in the level of capitalization of the business. If, for example, profit rates increase unexpectedly, say from 40 percent to 50 percent because mineral prices increase, then we would expect the stock price to increase and shareholders would realize, at least over the short run, an increased rate of return from the unanticipated increase in prices. Likewise, if profits decrease unexpectedly, say from 50 percent to 30 percent because of a decrease in prices, the company's stock price would fall and shareholders would realize a low (perhaps negative) return.

84. But now suppose that profit margins remain constant at a super-competitive rate of [redacted] percent. In that case there would be no unusual change in the stock price, and on

[54] "Submission to the Second Sheshinkski Committee on Mining Royalty and Tax Regime Issues," Howard N. Rosen (FTI Consulting,) November 4, 2013, p. 44.

average the rate of return to shareholders would be at the normal competitive level that reflects the stock's systematic (non-diversifiable) risk. In the case of ICL, that average rate of return might be around 13 percent, reflecting the company's systematic risk. The value of the company will be high (because of the high rate of profits), but the stock price should not be expected to increase by more than a normal risk-adjusted rate of return.

85. This point is so important that it is worth repeating: The fact that the average rate of return on ICL's shares has been at a normal competitive level does *not* in any way imply that ICL's profits have been at a normal competitive level. In fact, we have shown quite clearly that ICL's profits have been far above a normal competitive level.

86. How then, can we ensure that minerals resource tax is applied in such a way as to ensure that the company will still earn a normal rate of return on any future capital investments? In the next section, we measure the rate of return for the mining industry to determine a competitive rate of return. In the final section, we show how this normative rate of return can be used in the taxation framework.

RATE OF RETURN ON INVESTMENT

87. The discussion so far has focused on determining excess profits through the comparison of operating profits to an industry benchmark of profitability. We next turn to an alternative approach of determining excess profits through comparison of rate of return on investment to a normal rate of return for the industry.

88. I rely on the Capital Asset Pricing Model (CAPM) to estimate the expected or normal rate of return[55] that an investor can earn from a typical mining industry project. In my previous report submitted to the Israeli Ministry of Finance, I provided a detailed discussion of the CAPM.[56] In this section, I briefly describe this model.

89. Under this approach, $r_E = r_f + \beta \times (r_m - r_f)$. According to the formula, the expected return on a company's equity, r_E, is equal to the risk-free rate, r_f, plus an equity risk premium that accounts for non-diversifiable (or systematic) risk. This equity risk premium is equal to the risk premium on the overall stock market (calculated as the difference between the expected return on the overall market, r_m, and the risk-free

[55] The expected or normal rate of return I estimate in this report is in nominal terms, i.e., it is not adjusted for inflation.

[56] See, Robert S. Pindyck, "Investments in Offshore Oil and Natural Gas Deposits in Israel: Basic Principles," November 13, 2010 ("First Pindyck Report").

rate, r_f), multiplied by the "beta" (β) for the company's stock.[57] Beta measures the extent to which the return on an investment is correlated with the overall stock market.

90. The CAPM is a simple model, with its own limitations. For example, it is a static model that ignores any change in returns. As another example, it associates the return on an investment with only one single factor, namely, the return on the overall stock market. Therefore, it does not account for other possible factors that might affect the investment return. Despite these limitations, however, the CAPM continues to be a widely used method that provides a reasonable rough guideline for the rate of return estimate.

91. Below, I lay out the steps I take to calculate the expected rate of return, using the CAPM.

- Step 1: Compile a sample of companies that are publicly traded and primarily engaged in mining operations.
- Step 2: For each company, compute the beta of the stock (i.e., the equity beta or levered beta) as well as the beta of the stock, independent of financing (i.e., the asset beta or unlevered beta). I then consider the mean or median unlevered beta of the sample as a measure of the beta for mining industry projects.
- Step 3: Estimate an expected risk-free rate.
- Step 4: Estimate an equity risk premium.
- Step 5: Use the CAPM formula to calculate the expected rate of return.

THE RATE OF RETURN ON MINING INVESTMENTS

92. **Mining Companies.** I analyzed companies with mining activities in areas most representative of the mineral reserves in Israel, namely potash, phosphate, bromine, magnesium, and copper. This set of 13 large global mining companies provides a sufficient number of public companies from which to obtain a reasonable estimate of an industry beta.

93. **Beta Estimation.** For each mining company, I compute the beta of the stock (i.e., the equity beta or levered beta) using a standard regression model that relates the return on the stock to the return on the overall stock market. Specifically, the regression

[57] Brealey, Richard A., Stewart C. Myers, and Franklin Allen, *Principles of Corporate Finance,* 10th ed., McGraw-Hill Irwin, 2011 ("Brealey Myers, 10th ed."), p. 193.

equation is: $r_{E-} r_f = \alpha + \beta \times (r_{M-} r_f)$, where r_E is the return on the stock, r_M is the return on the broad market (which is represented by the MSCI World Index), r_f is the return on a riskless investment (such as short term Treasury bills), and beta (β) is the regression coefficient (or slope). For each company, I perform the regressions a number of different ways: using five years of weekly data, using ten years of weekly data, using five years of monthly data, and using ten years of monthly data.

94. The use of financial leverage (e.g., debt) increases the risk (and consequently the required rate of return) to an equity holder.[58] Therefore, when a company has debt, its levered beta is greater than the beta of the project independent of financing (i.e., asset beta or unlevered beta), which is what my analysis attempts to measure. In order to estimate the unlevered beta for each comparable company, I use the standard formula, Unlevered Beta = Levered Beta / [1 + (1 - Tax Rate) × (Debt / Market Capitalization)], to remove the portion of the levered beta that is due to the use of debt financing.

95. **Table 1** reports the levered ("raw") betas and unlevered betas for each company in the sample. I calculate the simple average as well as the average of the 25th to 75th percentiles for the sample of firms. The unlevered average betas range from 0.96 to 1.30 depending on the particular regression. In addition to these averages, I also computed the beta on a composite portfolio comprised of these companies in equal proportions. The betas for this composite portfolio range from 0.94 to 1.13 depending on the particular regression. Finally, I understand that ICL claims that Arab Potash Company is its most comparable competitor. I calculated the beta for Arab Potash and for ICL itself (on the grounds that surely ICL is representative of ICL). Both these companies have betas lower than the average of the sample of companies I analyzed. The average of the betas of these two companies ranges from 0.38 to 0.89.

[58] Brealey Myers, 10th ed., pp. 419-428.

Table 1. Beta calculation for Mining Companies

	Weekly Data				*Monthly Data*			
	1/1/2009 - 12/31/2013		1/1/2004 - 12/31/2013		1/1/2009 - 12/31/2013		1/1/2004 - 12/31/2013	
Company	**Raw Beta**	**Unlevered Beta**	**Raw Beta**	**Unlevered Beta**	**Raw Beta**	**Unlevered Beta**	**Raw Beta**	**Unlevered Beta**
Mosaic Co/The	1.27	1.23	1.53	1.45	0.99	0.96	1.36	1.29
Uralkali OJSC	1.17	1.09	1.80	1.70	1.60	1.48	1.80	1.70
K+S AG	1.14	1.06	1.20	1.13	1.06	0.99	1.27	1.19
BHP Billiton Ltd	1.55	1.39	1.67	1.51	1.47	1.32	1.52	1.38
Rio Tinto PLC	1.93	1.60	1.68	1.43	1.43	1.19	1.60	1.36
Vale SA	1.44	1.20	1.70	1.44	1.32	1.11	1.63	1.39
Anglo American PLC	1.57	1.32	1.58	1.38	1.50	1.26	1.42	1.24
Glencore PLC	1.32	0.99	1.32	1.03	1.02	0.76	1.02	0.80
Arab Potash Co	0.15	0.15	0.22	0.22	0.50	0.49	0.81	0.80
Jordan Phosphate Mines	0.08	0.08	0.16	0.15	0.65	0.62	0.60	0.58
Southern Copper Corp	1.61	1.51	1.87	1.78	1.43	1.35	1.64	1.55
Potash Corp of Saskatchewan Inc	1.25	1.17	1.29	1.21	0.71	0.66	1.14	1.07
Hubei Xingfa Chemicals Group Co Ltd	0.27	0.19	0.02	0.01	0.37	0.26	0.58	0.40
Average	1.13	1.00	1.23	1.11	1.08	0.96	1.26	1.14
Avg 25-75	1.31	1.15	1.47	1.30	1.14	0.99	1.33	1.19
Std. Dev.	0.57	0.50	0.63	0.57	0.40	0.36	0.39	0.37
COMPOSITE	1.13	0.98	1.23	1.08	1.08	0.94	1.28	1.13
Arab Potash Co	0.15	0.15	0.22	0.22	0.50	0.49	0.81	0.80
Israel Chemicals Ltd.	0.65	0.61	0.82	0.77	0.69	0.64	1.05	0.98
Average	0.40	0.38	0.52	0.49	0.59	0.57	0.93	0.89

96. **Risk-Free Rate.** The risk-free rate is the return an investor would get from holding a nearly riskless asset, such as a short-term U.S. Treasury security. For investments with a long-term horizon, such as the ones at issue in this case, an appropriate measure of the risk-free rate of return is the expected average future U.S. Treasury Bill yield.

97. Longer-term U.S. Treasury bond yields contain information on the market's expectation for future short-term interest rates. However they also contain a risk premium over short-term rates to compensate for other risks, such as the risk of inflation in the intervening years. Historically, this spread has been about 1.5 percent.[59] Over the past 10 years, the average yield on 20-year U.S. Treasury Bonds has been 4.14 percent.[60] Subtracting the 1.5 percent spread from the recent average yield on U.S. Treasury Bonds results in an expected average short-term rate of 2.64 percent over the future 20 years. Thus, I estimate the risk-free rate to be 2.64 percent.

[59] Ibbotson SBBI, 2013 Classic Yearbook, Morningstar Inc., 2013, pp. 11, 23. According to Ibbotson, from 1946-2012, the U.S. equity market returned a 6.3 percent premium to long-term U.S. Treasury Bonds, and a 7.8 percent premium to short-term U.S. Treasury Bills. This implies an average spread of 1.5 percent between long-term and short-term Treasury securities.

[60] Historical U.S. Treasury yield data available at: <http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yield>.

98. **Equity Risk Premium for Israel.** The third input into the CAPM is an equity risk premium, which measures the expected rate of return on the overall stock market (i.e., the return from holding a broadly diversified portfolio of stocks) over and above the risk-free rate. It compensates investors for non-diversifiable (or systematic) risk. Often, a U.S. market index, such as the S&P 500, is chosen to represent the overall stock market.

99. Given that Israel faces a heighted risk of terrorism and military conflicts, and that energy facilities located in Israel are particularly at risk, it is necessary to consider whether one should incorporate Israel-specific risks into the equity risk premium estimate. I am aware that academics are divided on whether it is appropriate to use a country-specific equity risk premium. However, as previously discussed in the First Pindyck Report, I believe that it is not necessary to include any country-specific risk premium in the CAPM, because these risks are largely diversifiable by investors through holding the stocks of companies operating in different areas of the world.[61]

100. One traditional and accepted method of computing the equity risk premium is to examine the historical returns of the overall stock market compared to the returns of a risk-free instrument. This approach results in a 7 percent equity risk premium, based on an arithmetic average of the return on the S&P 500 over the return on U.S. Treasury Bills over the past several decades.[62] Limiting the time period to the more recent past, or using a geometric average rather than an arithmetic average, would lower the equity risk premium. Rather than use a backward looking calculation that relies on historical data, other accepted methods use current market prices, dividend yields, and growth projections to calculate an implied equity risk premium. The implied equity premium has generally been lower than the historical risk premium in the recent past. Not surprisingly, given the myriad of different approaches that can be taken, academics, analysts and company managers use a wide range of estimates in practice. In 2009, the average risk premium used in corporate finance textbooks was 5.7%.[63] In 2011, the average risk premium used by academics, analysts, and companies was 5.6%, 5.0% and 5.5%, respectively.[64] To capture this wide range of acceptable estimates, I will use both 5.5% and 7% in my calculations of the expected rate of return.

101. **Expected Rate of Return Using CAPM.** I have now derived all three inputs to the CAPM formula: $r_E = r_f + \beta \times (r_m - r_f)$. However, I note that the CAPM provides an estimate of the

[61] First Pindyck Report, pp. 21-22.

[62] First Pindyck Report, p. 8.

[63] P. Fernandez, "The Equity Premium in 150 Textbooks," *IESE Business School,* November 2013, p. 3.

[64] P. Fernandez, J. Aguirreamolla, and L. Corres, "Market Risk Premium Used in 82 Countries in 2012, a Survey With 7,192 Answers," *IESE Business School,* June 2012, p. 8.

after-tax rate of return. For the purpose of determining excess profits, I need to convert the CAPM-based after-tax rate of return to a pre-tax rate of return by dividing the former by one minus the corporate tax rate. Using KPMG's current estimate of 26.5 percent for Israel's corporate tax rate,[65] I calculate a pre-tax rate of return. **Table 2** below shows the calculation of the pre-tax rate of return using the various beta estimates shown in Table 1 and a range of equity risk premia.

102. It is important to stress that the CAPM calculation should be viewed as a *rough estimate*, rather than a precise number. This is because the inputs into the CAPM are difficult to measure precisely.[66] Based on the preceding analysis, I conclude that the CAPM-based pre-tax rate of return estimate is in the range of 11 percent to 15 percent. My best estimate of the pre-tax rate of return is in the middle of this range, i.e., approximately 13 percent.[67]

Table 2. Pre-Tax Rate of Return for Mining Companies

	Weekly Data				*Monthly Data*			
	1/1/2009 - 12/31/2013		1/1/2004 - 12/31/2013		1/1/2009 - 12/31/2013		1/1/2004 - 12/31/2013	
	Pre-Tax Rate of Return - 5.5% ERP	Pre-Tax Rate of Return - 7.0% ERP	Pre-Tax Rate of Return - 5.5% ERP	Pre-Tax Rate of Return - 7.0% ERP	Pre-Tax Rate of Return - 5.5% ERP	Pre-Tax Rate of Return - 7.0% ERP	Pre-Tax Rate of Return - 5.5% ERP	Pre-Tax Rate of Return - 7.0% ERP
Mining Company Group Average	11.1%	13.1%	11.9%	14.2%	10.8%	12.7%	12.1%	14.4%
Mining Company Group Avg 25-75	12.2%	14.5%	13.3%	15.9%	11.0%	13.0%	12.5%	14.9%
COMPOSITE	10.9%	12.9%	11.7%	13.9%	10.6%	12.5%	12.0%	14.3%
ICL and Arab Potash Co. Average	6.4%	7.2%	7.3%	8.3%	7.9%	9.0%	10.3%	12.1%

TAX CALCULATIONS

103. **Profitability**. As discussed at the outset of this report, where profits earned on the extraction and sale of minerals exceed industry standards, those excess profits reflect the value to the producer of having access to natural resources. Insofar as those natural resources belong, in this case, to the State of Israel and its citizens, a portion of that value should be shared with the State. Of course, the producer should still be able

[65] See, <http://www.kpmg.com/global/en/services/tax/tax-tools-andresources/pages/corporate-tax-rates-table.aspx>.

[66] For example, the standard deviation of beta values in **Table 1** shows a great degree of variability among the mining companies.

[67] I note that a 13 percent rate of return is a generous estimate as the rate of return implied by the average unlevered beta of ICL and Arab Potash Co., ICL's most comparable competitor, suggests a much lower value, somewhere between 6.4 percent and 12.1 percent.

to earn a competitive rate of profit; over-taxing will lead to underinvestment, lower production, and ultimately lower revenues for the State. The question is then one of defining an appropriate benchmark for this profitability.

104. As discussed previously, ICL's profit margins in potash, bromine, and phosphate are considerably higher than the average profit margin for mining and minerals companies. This supports the idea that a higher tax can be imposed to capture more of the inherent value of the mineral for the resource owner, the state of Israel. Any taxation scheme imposed should allow ICL (and other mining and minerals companies in Israel) to earn at least a competitive rate of return.

105. On the basis of the observed level of profitability in mining industries generally, as reported in **Exhibit 1** and **Figures 11-13**, the Committee may wish to consider a taxation scheme wherein any operating profits up to 15 percent will not be assessed an additional mineral extraction tax. [68] The 15 percent profit margin is the approximate average of profits for mineral mining companies, thereby allowing ICL to earn an average profit on its operations in Israel.

106. For any profits above 15 percent, a portion will be owed to the State as a mineral extraction tax (i.e., separate and apart from corporate income tax). This form of tax shifts any price risk to the government. Suppose for example, that prices fall to the point where the company earns less than a 15 percent margin. In that case, it will owe no excess profits tax to the government.

107. We are not offering the opinion that 15 percent is the best or only possible choice. The Committee may wish to opt for a higher rate. For example, a 20 percent profit margin would be slightly above the upper quartile of profits for mineral mining companies, and would make mineral mining in Israel quite profitable by world-wide standards.

108. It is important to note that, in the specific case of potash, it is not relevant that the benchmark profit margin chosen, whether it be 15 percent, 20 percent, or some other rate, is lower than the historical average profit margin for potash producers. Those historical potash profit margins reflect supra-competitive profits resulting in part from cartel pricing. The appropriate benchmark for comparison is a *competitive* level of profit, not a monopoly or cartel level of profit.

109. So long as the rate chosen is above the competitive level of profit, the Committee need not be concerned that a producer such as ICL would have an incentive to shift production to lower-tax countries and to reduce their level of operations in Israel. Unlike capital-intensive activities such as greenfield development of oil or gas fields,

[68] Recall that operating profit is defined as earnings before taxes and interest or other financing costs.

little capital investment is required to extract minerals in Israel, and therefore producers do not face a choice of where to invest limited capital. Even if it were the case that its profit margins elsewhere were higher, a company like ICL would continue to produce in Israel because it would still be profitable to do so. We note, furthermore, that these circumstances may be unlikely to arise in the first place. As discussed above, costs of production are low in Israel leading to higher relative profitability. For example, ICL's operating profits for its Spanish mining operations have been [redacted] between 2006 and 2011.[69]

110. **Return on Capital**. An alternative to a tax regime based on profitability in excess of a normal level of profit, is to look instead at the return on investment. In this alternative, the excess profits to be taxed would be those profits that exceed the normal rate of return on a company's investment.

111. On the basis of the observed rate of return demanded by investors in mining companies generally, as reported above, the Committee may wish to consider a taxation scheme wherein any returns on capital up to 13 percent will not be assessed an additional mineral extraction tax. [70] The 13 percent rate of return is the approximate mid-range number of the observed unlevered rates of returns for large public companies in the metal and non-metal mining industries, thereby allowing ICL to earn a normal rate of return on its capital investments in Israel (or elsewhere). For any return above 13 percent, a portion will be owed to the State as a mineral extraction tax (i.e., separate and apart from the corporate income tax).

112. In order to implement an extraction tax based on a 13 percent rate of return, we must first define the capital stock to which this threshold rate is applied. The capital stock should be based on an on-going calculation that considers both new capital investments along with depreciated capital. Under this model, in a given year, the capital stock from the prior year would increase by the amount of new invested capital, but would decrease by the depreciation expense on the prior year's capital stock.

113. Once the capital stock has been established, the next step is to calculate the current-year profit as a percentage of the capital stock. Any profit over the 13 percent threshold would be subject to the extraction tax. However, if profits are less than 13 percent in a given year, the dollar difference between the actual profits and the threshold profits, defined as 13 percent of the current capital stock, could be used to offset the extraction tax in future years. We discuss this "carry-forward" feature in more detail below.

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[69] Integer Research, Outlook for Potash, Third Edition, p. 125.

[70] Recall that operating profit is defined as earnings before taxes and interest or other financing costs.

114. **Carry-forward feature.** Given the significant volatility in worldwide minerals prices that we observe historically, we recognize the need to adapt to changing industry conditions. We recommend, therefore, that the mineral extraction tax have a carry-forward feature. The carry forward feature applies to either a tax based on profitability or tax based on return on capital. In the case of a tax based on profitability, suppose for example, ICL earns only $10 million in operating profits on revenues of $100 million (a 10 percent margin). Assuming the statutory allowed profit margin is 15 percent, there would be a shortfall of 5 percent. This shortfall percentage would be applied to the $100 million in revenues (yielding, in this case, $5 million), and the resulting dollar *amount* (i.e., not the percentage shortfall) can be carried forward and applied as an offset in future years. The effect will be to smooth the taxable revenue, allowing poor years to partially offset good years. We propose that an operating profit shortfall can be carried forward for a maximum of five years.

115. In the case of a tax based on a rate of return, suppose that ICL has a capital base of $100 million and the normative rate of return has been set at 13 percent. This would imply that ICL should earn $13 million before any tax is applied. Suppose it earns only $12 million in operating profits in a given year. The $1 million shortfall between the operating profits and the normal return on capital would be carried forward and applied as an offset in future years.

116. **Carry-forward example for profits.** The following example (summarized in the table below) illustrates how our proposed taxation scheme could be applied to a mining company's profits over a five year period. In year one, the mining company generates $5 million in operating profits on revenues of $100 million. The statutory margin of 15 percent allows the mining company to earn up to $15 million in operating profits on revenues of $100 million without having to pay an additional extraction tax. But because the mining company only earned $5 million, he can use the remaining $10 million allowance to offset future profits, for up to five years.

117. In year two, the mining company earns operating profits of $15 million on $100 million of revenue. Because this amount equals the statutory allowance, the mining company does not incur an additional extraction tax.

118. In year three, the mining company earns $35 million in operating profits on $200 million in revenue and the statutory allowance for $200 million in revenues is $30 million. Therefore, without an offset, the full balance, $5 million, is subject to the extraction tax. The mining company can carry forward $5 million from its operating profit shortfall in year one to offset their earnings in year three such that the effective profit rate equals the statutory margin (thus, not incurring an additional extraction tax).

119. In year four, the mining company earns $15 million on revenues of $100 million, which equals the statutory rate and no additional extraction tax would apply.

120. Finally, in year five, the mining company earns $45 million in operating profits on $200 million in revenue. The mining company can offset its operating profit in year five by the remaining shortfall of $5 million from year one. (At this point, the mining company has exhausted their original offset balance of $10 million from year one.) The effective operating profit in year five becomes $40 million. With a statutory allowance of $30 million on $200 million in revenues, the mining company is responsible for paying extraction taxes on the $10 million difference.

	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue	$100	$100	$200	$100	$200
Operating Expenditures	$95	$85	$165	$85	$155
Operating Profit/ Margin	$5 / 5%	$15 / 15%	$35 / 18%	$15 / 15%	$45 / 23%
Carry forward offset	$0	$0	($5)	$0	($5)
Effective Profit	$5 / 5%	$15 / 15%	$30 / 15%	$15 / 15%	$40 / 20%
Statutory Margin	$15 / 15%	$15 / 15%	$30 / 15%	$15 / 15%	$30 / 15%
Profit Subject to Tax	$0	$0	$0	$0	$10
Shortfall to carry forward	($10)	$0	$0	$0	$0

121. **Carry-forward example for rate of return.** The carry-forward feature can be similarly applied to a taxation scheme based on a rate of return. As described earlier, a profit shortfall in a given year could be used to offset taxable income in future years. The following table provides an analogous example of a carry-forward feature for a tax regime that uses rate of return.

122. Consider a mining company in year one. If the total capital stock of a mining company were $100 million, the statutory level of profits allowable under this regime would be $13 million. Any profits above this threshold would be subject to an extraction tax. However, if a mining company only earned $10 million in profits in year one, as was the case in our earlier example, the mining company would not pay an extraction tax in year one. Additionally, the shortfall of $3 million (the statutory profit minus in a given year minus the actual profit in the same year) could be used to offset future profits for a period of up to five years.

123. In year two, the mining company earns $9.8 million in operating profits. However, the mining company has not made any new capital investments and has incurred a depreciation expense of $25 million on its existing capital. Therefore, the capital stock is now valued at $75 million. Using the proposed statutory rate of return of 13 percent, the threshold profit allowed in year two before the imposition of the extraction tax is $9.8 million (= $75 million * 13 percent). Because the statutory profit is equal to the operating profit, the mining company would not be required to pay any extraction tax,

but they also do not accrue any additional carry-forward offset.

124. In year three, the mining company's operating profits increase substantially to $45 million. Also, as in year two, the mining company has not made any additional capital investments and has incurred a depreciation expense of $25 million on its existing capital. The remaining capital stock is now valued at $50 million, which corresponds to a statutory threshold profit of $6.5 million. The mining company would be subject to an extraction tax based on the difference between the statutory profit and their operating profits, which in year three is $38.5 million (= $45 million - $6.5 million). But because the mining company incurred a shortfall of $3 million in year one, they can use this to offset their profit that is subject to tax. Therefore, using the carry-forward feature, the extraction tax would be imposed on profits of $35.5 million, and not $38.5 million.[71]

	Year 1	Year 2	Year 3
Revenue	$100	$100	$200
Operating Expenditures	$90	$90.2	$155
Operating Profit/ Margin	$10 / 10%	$9.8 / 10%	$45 / 23%
Carry forward offset	$0	$0	($3)
Effective Profit	$10	$9.8	$42
Capital Stock	$100	$75	$50
Statutory Profit	$13	$9.8	$6.5
Profit Subject to Tax	$0	$0	$35.5
Shortfall to carry forward	($3)	$0	$0

125. **Updating the benchmark.** In addition to carry-forwards, we propose that profitability and rate of return benchmarks be re-estimated every three years, to reflect potential structural shifts in the market. This can be undertaken in the same way that we have estimated average mining industry profit margins and mining industry rate of returns.

126. **Importance of corroboration.** As we have demonstrated above, we believe that from an audit perspective, transfer pricing approaches to price estimation and cost allocation, in conjunction with data from third-party sources (such as private research firms, government agencies, academic studies, etc.) will yield robust, defensible estimates of the producers' profitability. We stress the importance of corroboration,

[71] In this example we show only three years. However, as in the carry-forward example for profits, we propose that an operating profit shortfall can be carried forward for a maximum of five years under the rate of return scheme.

whenever possible, with third-party data; estimation methodologies that rely exclusively on internal financial data such as profit-and-loss statements may be susceptible to manipulation.

CONCLUSIONS

127. Whether the Ministry of Finance decides to implement a fiscal regime using an approach based on profits or an approach based on rate of return, the fundamental principles are the same. The basic idea behind the two approaches is that profits from the extraction and sale of minerals from mining operations in Israel should not exceed a competitive level. The key difference in the two approaches is how one defines the competitive level of profits. In the "excess profits" approach, competitive profits are in relation to the revenues generated from the sale of minerals by reference to industry average operating profit margins. The rate of return approach, by contrast, evaluates profits in relation to the value of the capital stock by reference to the industry cost of capital. Under either method, the State of Israel receives fair and adequate rent for the valuable resources in the ground, while the mining company receives a competitive level of profits commensurate with its activities.

128. What numbers should be used for the benchmark level of competitive profits and the benchmark rate of return? We have found that the benchmark competitive profit margin is about 15 percent, so that profits above this level would be subject to an additional resource tax. We have also found that the benchmark competitive rate of return is about 13 percent, so that realized returns above this level would likewise be taxed. However, the tax regime should include a carry-forward feature, so that profit or return shortfalls (i.e., profit margins below 15 percent or realized rates of return below 13 percent) could be carried forward and applied against excess profits or an excess rate of return in future years.