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Bergen, 27.07.06



Valuation in Emerging Markets

How to adjust the cost of capital for country risk

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This thesis was written as a part of the Master of Science in Economics and Business Administration program. Neither the institution, nor the advisor is responsible for the theories and methods used, or the results and conclusions drawn, through the approval of this thesis.

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1 Abstract

In this paper, we conduct valuations on four Argentine companies, all registered on the Buenos Aires Stock Exchange. Our goal is to investigate how to best calculate the relevant cost of capital in emerging markets. We start by thoroughly presenting the Argentine economic history and present macro-economic environment, before we present relevant theory for conducting valuations in emerging markets. We further carefully discuss theory on calculating the cost of capital and how to apply it. We take on different assumptions on the level of market integration when calculating the cost of equity, which we plug into the weighted cost of capital formula (WACC). Our valuations are conducted using the discounted cash flow-approach. Based on our results, we try to identify methods to calculate the cost of equity superior to other methods. Our valuations are based upon our own subjective assumptions and information collected by us.

2 Introduction

In later years, emerging markets have increasingly become the focus of the international investor. The markets have dramatically increased the investment opportunities in new areas of the world. This presents both opportunities and challenges for investors when it comes to performing valuations.¹ The process of valuation in emerging markets has several aspects attached to it that is not prevalent in the developed markets, such as the lack of market efficiency and the level of integration, liberalization, information, etc.

The valuation of companies in emerging markets can not be based entirely on the existing framework for valuation in developed markets.² In emerging markets, it is common to use the weighted scenario discounted cash flow-approach, in combination with the multiples approach when valuing companies. We argue that due to lack of information, considering both quantity and quality, there must be an easier way to conduct these valuations. It may prove difficult and time consuming to adjust the cash flows, and the multiples may be meaningless. When using the discounted cash flow valuation on companies in emerging markets, either cash flows or the discount rates used, have to be properly adjusted to account for the special features of the transitioning markets. We argue that adjusting the discount rate may be a more efficient solution.

In order to investigate this we will conduct valuations on four companies registered on the Argentine stock exchange. We will use a discounted cash flow approach when conducting the valuations, using a range of costs of equity. The different costs of equity are based on different assumptions of the level of market integration and risk factors, trying to incorporate the differences between developing and emerging markets. The different measures take on different views on what is systematic and unsystematic risk in the market. That is, which risks are diversifiable and which are not.

¹ (Pereiro, 2002)

² (Pereiro, 2002)

The four companies chosen are large companies, trading on the Buenos Aires Stock Exchange. We originally wanted to analyze smaller, privately owned companies, in order to investigate unsystematic risk in emerging markets. Unfortunately, this proved to be a difficult task, due to the availability of company information. Even in the case of some of the large, publicly traded companies, obtaining company data adequate to conducting valuations was impossible.

As already mentioned, we are going to use several methods when calculating the cost of equity. Based on the different models and assumptions we will try to develop our own method to compute the cost of equity. We will try to analyze whether some of the methods give consistently better results, that is, reflect the value of the company in a better way. We will also try to make a connection between the realism of the assumptions and the results.

We take the perspective of an international investor, with the means of diversifying his portfolio internationally (if possible). The investor is risk averse, and as such take into account a risk-return tradeoff when considering investments.

We start with a presentation of the Argentine economy in chapter 3, where both the historic and the present macro economic environment are presented. In chapter 4 we present relevant theory on conducting valuations in emerging markets, before we discuss how to model the cash flows in chapter 5. Theory on the cost of equity is further presented in chapter 6, before considering how to incorporate unsystematic risk effects in chapter 7. Chapter 8 presents how we estimate our different costs of capital. Chapters 9 through 12 present the valuations of our four companies. Finally, in chapter 13 we will sum it up with discussions and conclusions.

3 Presentation of Argentina

3.1 Economic History

In 1994, a new constitution was introduced, which effectively put an end to the military system that led the country in the 1960's and 1970's. The country comprises one federal district, 23 provinces and the National territory of Tierra del Fuego. The executive president is elected every six years, answering to parliament. Nestor Kirchner is the current president.

Argentina benefits from rich natural resources, a highly literate population, an export-oriented agricultural sector, and a diversified industrial base. The country's favourable climate and fertile soils have traditionally made Argentina a leading agricultural power. Argentina also has around 2,9 million barrels of proven oil reserves, which makes them a large player in the Latin American oil market. The oil industry is completely privatized, and has experienced a decline in production after peaking in 1998. This is mostly due to the collapse of the Argentine economy and its lasting effects.

Over the past decade, the country has suffered problems of inflation, external debt, capital flight, and budget deficits. Growth in 2000 was a negative 0.8%, as both domestic and foreign investors remained sceptical of the government's ability to pay debts and maintain the peso's fixed exchange rate with the US dollar. The economic situation worsened in 2001 with the widening of spreads on Argentine bonds, massive withdrawals from the banks, and a further decline in consumer and investor confidence. Government efforts to achieve a "zero deficit," to stabilize the banking system and to restore economic growth proved inadequate in the face of the mounting economic problems. The peso's peg to the dollar was abandoned in January 2002, and the peso was floated in February. The exchange rate plunged and real GDP fell by 10.9% in 2002, but by mid-year the economy had stabilized, although increased at a lower level. GDP expanded by about 9% per year from 2003 to 2005. Growth is being led by domestic demand, solid exports, and favourable external conditions.³

³ (The World Factbook, [Internet], 2006)

3.2 Argentina macroeconomic report

3.2.1 Argentina and the world economy

Harvey has conducted research where he concluded that Argentina was liberalized in the early 1990's. Investment Company Institute states 1989 as the year of market liberalization. Still, when looking at the following measures of market integration⁴, it seems clear that the economy is not fully integrated with the world economy.

- Size: Argentina's stock market compared to GDP is less than 6%, showing that the Argentine market is less liquid than markets in the developed economies.
- Volatility: Lower volatility is often a sign of a more developed market. The Argentine market is eight times more volatile than the Dutch market. The Dutch market is considered an efficient market, integrated with the global market.
- Concentration: The 10 largest market cap-companies share of the total market value is 60 % in Argentina.
- Asset pricing efficiency is not very high, according to the World Bank.

3.2.2 Current situation

The problems the Argentine economy faces today are characterised by the lacking ability to perform despite its potential⁵, doubt whether Argentina has either political leadership or will needed to reform the governmental and economic institutions to get Argentina competitive in a globalizing world economy and the lasting effects from the debt default in 2002. A combination of expansionary monetary, fiscal and wage policies that boosted domestic demand in an environment of insufficient investment and growing capacity constraints has raised inflation in 2005. The inflationary pressure due to demand-pull pressures, as well as expansionary policies, worsens the situation. Currently, the inflation rate remains stable, the exchange rate is highly competitive and the fiscal balance shows a surplus. Moreover, unemployment is still on the decline and social mobility seems to be developing after more than a decade. If Argentina succeeds in addressing the present problems and keeps the same economic track, international confidence in the country

⁴ (The World Bank, [Internet], 2006)

⁵ Argentine review 2006, Economic Overview

may be restored enabling the country to confirm and consistently sustain the performance it has shown so far.⁶

Main indicators

	1998	1999	2000	2001	2002	2003	2004	2005 (P)
Actual GDP growth (in %)	3.9%	-3.4%	-0.8%	-4.4%	-10.9%	8.8%	9.0%	7.5%
Inflation (price mix) in % *	-1.1%	-2.1%	1.5%	-1.7%	49.4%	16.0%	5.9%	16.8%
Unemployment rate ***	15.0%	16.3%	17.0%	20.5%	20.7%	14.5%	13.0%	10.7%
Fiscal result (without privatizing results) in % of the GDP	0.8%	0.3%	1.0%	0.5%	0.7%	2.3%	3.9%	3.4%
FOB exports (in million dollars)	26,442	23,333	26,409	26,610	25,710	29,565	34,550	38,200
CIF imports (in million dollars)	31,404	25,507	25,244	20,320	8,991	13,834	22,447	28,600
Trade balance (in million dollars)	-4,962	-2,174	1,165	6,289	16,719	15,731	12,103	9,600
Payment balance current account (in million dollars)**	-14,482	-11,944	-8,981	-3,291	8,673	7,659	3,349	3,250

Main Indicators Argentina.⁷

3.2.3 Real GDP

The economy grew 8.9% in 2003, 9.0% in 2004, and 9.2% in 2005. The Central Bank of Argentina (BCRA) forecasts GDP growth for 2006 to 6.7%, down 2% from 2005.

Argentina's economy, Latin America's third-largest, is expected to grow by 4.2 percent this year, according to the International Monetary Fund (IMF). That is a decelerated growth compared with last year's estimate. CS First Boston is more optimistic and expects a GDP expansion of 5.5 percent this year. We estimate a 2006 GDP growth at 6%, reflecting a strong domestic economy with concerns about rising inflation and appreciating peso.

3.2.4 Monetary policy

BCRA will target monetary aggregates, the M2 growth target being 24%-32%. Their main targets are keeping the ARS at a competitive level and restoring its reserves, as well as keeping the interest rates at a low level. BCRA plans to accumulate US\$ 9.6 billion in reserves, in order to rebuild its reserves that were lost when the IMF debt was cancelled.

⁶ IRSA 20F Report

⁷ IRSA 20F Report

3.2.5 Inflation

Kirchner has continued the policy of maintaining the peso weak, in order to maintain the export competitiveness and hold back import growth.⁸ The cancellation of IMF debt in December 2005 and the following intervention in the foreign exchange market to rebuild foreign reserves have resulted in growth in the monetary supply. The following inflation highly increases the risk of capital flight during 2006.⁹ Rising inflation hurts economic growth and political stability. The Argentine Central Bank will in 2006 pursue its inflation target range of 8-11%. They have acknowledged that the monetary program alone will not guarantee achieving their goal. Therefore the government has announced the introduction of price agreements, which consist of a 15% reduction in the price of 250 mass consumption articles, as well as prudent wage policies. Other measures include eliminating tax rebates on export products (these products will not be exported and local supply should increase) and controls to stop non-competitive behaviour. There are several reasons why we believe the measures won't work:

- Policy mix will remain loose. Inflation rose to 12.3% in 2005 from 6.1% in 2004. The growing inflation may end up at 10.4 this year, according to IMF forecasts. Because of the focus on keeping the peso weak, monetary policy is too loose to control growth in inflation.
- The measures do not attack the sources of inflation. Fiscal policies is not the most effective instrument to reduce inflation, they work only on a short-term basis. The long-term effects may hinder growth in supply and investments and thereby contributing to keeping the inflation on a high level.

Because of this, and the fact that demand is currently growing faster than supply, we expect to see inflation climb to 15%. Considering the Central Bank's ambitions and the favourable economic conditions, we believe that inflation will drop till 4 % five years from now.

⁸ (Risk Summary: Argentina. Latin America Monitor: Southern Cone Monitor, Feb2006)

⁹ (Risk Summary: Argentina. Latin America Monitor: Southern Cone Monitor, Feb2006)

3.2.6 Interest rate

We conclude that the best expectations about interest rates can be found in the forward interest rates. We are using 8,7 as the current Argentine risk free rate (will be further discussed in our calculations). This is American 10 year Treasury bond added the EMBI+ Argentina yield spread. The current high levels of inflation imply negative real interest rates.

3.2.7 Currency

Argentina's currency is ARS. With the Balance of Payments (projected trade surplus at US\$11.5 billion) and the current account balance (2.5% of GDP in 2005) generating large positive capital inflows, there is a great pressure on the peso to appreciate. Because of this pressure and the expected rising inflation, the authorities' best chance is to let the peso appreciate. An appreciation of the exchange rate would stabilize the economy in Argentina. Cheaper imports would slow down inflation. The increased macroeconomic stability would further induce investments to pick up, contributing to increased industrial production.¹⁰ This would in turn lead to increased growth. Of course, we will also expect to see a reduction in exports. Looking at the Euromonitor forecast¹¹, we see that it is forecasted a stable exchange rate the coming years. The Euromonitor forecast is 2,96 in the longer run. We believe that BCRA will focus on avoiding inflationary pressure, leading to appreciation of the ARS. We estimate that the peso will average 3.05 in 2006, and then appreciate against US Dollars on a long-term basis. As a proxy to forecasted rates, we use forward exchange rates, assuming that the International Fisher Effect holds, and using U.S. and Argentine US dollar-denominated treasury bonds as proxies on forward interest rates. In the cases where an interest rate is not available, interpolation is applied to compute the missing rate. The calculations can be found in the appendix.

Forward exchange rates					
t	2007	2008	2009	2010	2011
(\$/f0)t	3,03	2,93	2,80	2,70	2,59

¹⁰ (Risk Summary: Argentina. Latin America Monitor: Southern Cone Monitor, Feb2006)

¹¹ Forecasts can be found through the Global Market Information Database through the library computers at NHH.

3.2.8 Conclusion

The durability of Argentina's economic recovery depends primarily on volatile external factors such as high commodity prices and low global interest rates rather than longer-lasting productivity gains. We expect increased levels of inflation, appreciation of the peso, reduced exports, increased imports, increased domestic supply and a reduction in GDP growth, as well as negative real interest rates.

4 Valuation Techniques

Valuation is more difficult in emerging market environments because of risks and obstacles to businesses not present in developed markets. Academics, investment bankers, and industry practitioners have yet to agree on how to address these challenges. Methods vary considerably and practitioners often make arbitrary adjustments based on intuition and limited empirical evidence.¹²

Valuation is “the process of determining the current worth of an asset or company. There are many techniques that can be used to determine value, some are subjective and others are objective.”¹³

Erb, Harvey, and Viskanta (1995) state that a professional investor can use his knowledge and models of investment markets to non-domestic arenas, but that the models may not apply in all markets.

¹² (Koller, Goedhart and Wessels, 2005, p. 621)

¹³ Investopedia [Internet], <<http://www.investopedia.com/terms/v/valuation.asp>> [Downloaded 25.06.06]

The most common techniques are multiples, Discounted Cash Flow (DCF) and Economic Value Added (EVA).¹⁴ We'll have a look at these and a couple of other techniques, commenting strengths and weaknesses.

4.1 Multiples

Valuation of companies using multiples is “a valuation theory based on the idea that similar assets sell at similar prices. This assumes that a ratio comparing value to some firm-specific variable (operating margins, cash flows, etc.) is the same across similar firms.”¹⁵ The company value is found by multiplying the calculated ratio from comparable companies with the firm-specific variable.

The most commonly used multiple is the Price-Earnings ratio (P/E), but because this multiple uses the accounting-based figure earnings, we prefer Enterprise Value-Earnings Before Interests and Taxes ratio (EV/EBIT). Although harder to calculate, this ratio focuses entirely on cash flows and does not depend on financing effects.

The technique's advantage, and disadvantage, is its simplicity. The methodology is often misunderstood and/or misapplied. The problem is that multiples state that companies only differ with respect to one value driver, which normally is not the case. Companies within an industry may have different multiples due to differences in the company structure.

4.2 DCF-based Valuation Models

4.2.1 EVA

Economic Value Added is a measure of a company's financial performance based on the residual wealth calculated by deducting cost of capital from its operating profit (adjusted for taxes on a cash basis).¹⁶

¹⁴ (Pereiro, 2002)

¹⁵ Investopedia [Internet], <<http://www.investopedia.com/terms/m/multiplesapproach.asp>> [Downloaded 22.06.06]

¹⁶ Investopedia [Internet], <<http://www.investopedia.com/terms/e/eva.asp>> [Downloaded 22.06.06]

The formula for calculating EVA is as follows:

Net Operating Profit After Taxes (NOPAT) - (Invested Capital * Cost of Capital)

Economic value added is the difference between the value the company delivers (NOPAT) and the value (return) the investors demand on their invested capital (Invested Capital * Cost of Capital). EVA identifies the best investments by identifying the companies that generates more value than the others. Firms that generate more value should over time perform better than companies with lower EVAs. Calculating EVA is straightforward and simple process. The problem with this method is the use of NOPAT. NOPAT does not fully reflect real cash flows (no add-back of depreciations, no capital expenditures or increases in working capital) which determines a company's value, and is not a good indicator of a company's profitability. This can be solved through numerous adjustments to balance sheets (inventory, depreciation and R&D).

4.2.2 APV

Adjusted Present Value: “The Net Present Value (NPV) of a project if financed solely by equity plus the Present Value (PV) of any financing benefits (the additional effects of debt)”¹⁷

The NPV of the company if financed solely by equity, is found by discounting the cash flows to the company with the cost of equity (instead of WACC), while PV of financing effects is calculated by discounting the financial effects with the proper rate of discount. For example, when finding PV (Tax shields), the tax shields are discounted by the risk free interest rate since these cash flows are perceived to be.

APV is great when a company's capital structure changes over time, because it uses the unlevered cost of equity (cost of equity if the company was 100% equity financed) when discounting the free cash flows. APV overcomes the problems related to WACC, encountered in other cash flow based valuation models. The WACC implies constant

¹⁷ <<http://www.investopedia.com/terms/a/apv.asp>> [Downloaded 22.06.06]

capital structure and tax rate. However, calculating APV is complicated and time consuming.

4.2.3 Equity Cash Flow

This method calculates cash flows to equity and then discounts them at the levered cost of equity. Using this method may prove to be difficult because capital structure is embedded in the cash flows. For example, increasing dividends means increased cash flows to equity, which leads to a higher valuation. One therefore needs to adjust the cost of equity whenever capital structure changes. In general, free cash flows are preferred to equity cash flows, because financing decisions shouldn't matter according to the Miller-Modigliani-theorem (Miller and Modigliani (1958)).

4.2.4 Enterprise DCF

“A valuation method used to estimate the attractiveness of an investment opportunity. Discounted cash flow (DCF) analysis uses future free cash flow projections and discounts them (most often using the weighted average cost of capital) to arrive at a present value, which is used to evaluate the potential for investment. If the value arrived at through DCF analysis is higher than the current cost of the investment, the opportunity may be a good one.”¹⁸

Calculated as:

$$DCF = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \dots + \frac{CF_n}{(1+r)^n}$$

CF = Cash Flow

r = discount rate (WACC)

By discounting cash flows with the risk adjusted cost of capital and then add them together, we find the present value of future cash flows, which is what the company is worth. Working out the weighted average cost of capital (WACC) can be tedious, but this represents an obstacle that can be overcome. The Enterprise DCF approach relies entirely

¹⁸ Investopedia [Internet], <<http://www.investopedia.com/terms/d/def.asp>> [Downloaded 22.06.06]

on company cash flows, not accounting-based earnings, making it a theoretically sound approach. When focusing on free cash flows to the company, financing effects are ignored. This is what the Miller Modigliani-theorem (Miller and Modigliani (1958)) states as the right approach to value companies. Also, the method is the favourite among practitioners and academics.¹⁹ Therefore, we will use the Enterprise DCF method.

In “Valuation of companies in emerging markets”, Pereiro suggest using the Stackable Premiums and Adjustment Method (SPAM)²⁰ for valuation. The SPAM model is given by:

1. Modeling of Cash Flow
2. Determination of the cost of capital
3. Adjust for unsystematic risk factors: Size, control and illiquidity effects.

We will follow Pereiro’s three steps when conducting our valuations. First we will present the theory of doing valuation in emerging markets, before presenting the actual valuations.

5 Modeling Cash Flow

When valuing our companies, we will use the three-step Stackable Premiums and adjustments model (SPAM) suggested by Pereiro in “Valuation in Emerging Markets”.²¹ The three stages are determination of the cost of capital, modeling of cash flows, and determination of unsystematic risk.

We will apply the DCF approach from Koller, Goedhart and Wessels (2005). This step-by-step approach includes the gathering of data, analysis of historical data, forecasting the explicit period and forecasting continuing value. Gathering of data and analysis of historical data

¹⁹ (Koller, Goedhart and Wessels, 2005, p. 103)

²⁰ (Pereiro, 200, p.136)

²¹ (Pereiro, 2002)

We extract financial datasets from the company websites. We start by reorganizing the financial data to reflect economic, and not accounting, performance. We reorganize the financial statement by using terms such as Net Operating Profit Less Adjusted Taxes, NOPLAT, and Free Cash Flow, FCF.

5.1 Emerging Markets Adjustments

When modeling cash flows in emerging markets, one has to adjust for overcompensation, over expensing, exchange risk and inflation risk.

5.1.1 Overcompensation

Closely held companies tend to pay higher salaries to their managers than public companies, due to the fact that the managers own the companies. The difference between actual salary and the market salary should be treated as dividends paid in advance.

5.1.2 Overexpensing

When owner-managers are responsible for excessive corporate expenses, operating expenses will be overestimated and as a result, cash flows will be underestimated. This effect should be eliminated by removing excessive personal spending elements from operating expenses and treat them as dividends paid in advance.

Overcompensation and overexpensing can be ignored when valuing large, public companies, because managers can't use the company's financial assets as their own personal wallet. If they do, corporate governance theory states that they will eventually be fired by the board, or the company will be overtaken by a competing firm.²²

5.1.3 Exchange risk

We will assume the viewpoint of an international investor, which means that the investor will be computing returns in U.S. dollars, regardless the country of origin of the investor.

²² (Brealey, Myers and Marcus, 2004)

Cash flows in the emerging market currency should be converted into U.S. dollars using the forward exchange rates we calculated in Argentina macroeconomic report.

5.1.4 *Inflation risk*

We adjust for the effects of unexpected inflation in the discount rate, by including it as a part of the country–risk premium. Therefore, this will not be handled in the modeling of the cash flows.

5.2 Analyzing Historical Performance

5.2.1 *Reorganizing financial statements*

We start by reorganizing the financial data to reflect economic, and not accounting, performance. This is done by converting the income statements into terms reflecting actual cash flows, such as Net Operating Profit Less Adjusted Taxes, NOPLAT, and Free Cash Flow, FCF.

5.3 Forecasting Performance

5.3.1 *Financial projections in real and nominal terms*

The explicit forecast period should be long enough for the company to reach a steady state. It is difficult for the international investor (or any investor) to forecast long periods because of the instable economic environments. Longer explicit periods would be of interest, but the longer time horizon brings more uncertainty. The question is whether the information is reliable on a longer time frame. Short time horizons may be problematic due to the fact they may result in a significant undervaluation of the company. We do not believe in the reliability of the data for ten years, and will as such use five years time horizon. Ratios and levels of growth are calculated using information from historical data and company outlook reports, which are then used to forecast the income statement, balance sheet, ROIC and FCF.

We start by retrieving income statements and balance sheets. We then analyze historical ratios and forecast the company’s future prospects. By using the growth forecasts and

historical ratios, we are able to forecast the income statement and the balance sheet for the explicit period. This process is described thoroughly in the following.

5.3.2 Income statement

5.3.2.1 Operating Income

We plug revenue growth estimates from the company outlook document into the model. Operating costs may simply be calculated as a percentage of revenues, or broken up and analyzed in parts, and then linked to a specific source of revenue. After finding gross income, we calculate sales and administration costs as a percentage of revenues.

5.3.2.2 Non-operating Income (Loss)

We forecast interest expense as a percentage of average debt during the year. Cost of debt is found by analyzing the historical interest/debt relationship. Interest income is forecasted as the historical return multiplied with the interest income driver. Other ordinary income and expenses are treated as a non-operating item, and are estimated as percentages of sales.

5.3.2.3 Taxes

We calculate the historical operating tax rate as follows:

$$\text{Operating tax rate} = [\text{Reported taxes} + T_m(\text{NOE}) - T_m(\text{NOI})] / \text{EBITA},$$

where T_m is the marginal tax rate, NOE are non-operating expenses and NOI are non-operating income. We use the 35% Argentine corporate tax rate as marginal tax rate. We assume a constant future operating tax rate. When we're calculating taxes in the cash flow analysis, we use the operating tax rate. To forecast the income statement, we need to estimate reported taxes. This is done simply by starting with operating taxes and work backwards by subtracting tax shields and adding marginal taxes on non-operating income.

5.3.3 Balance sheet

Inventories and accounts payable are calculated as a historical percentage of costs of goods sold. We assume that any cash above 2% of sales are excess to the needs of business operations. Therefore, we calculate operating cash as 2% of sales, and plug the rest into excess cash. Accounts receivables, fixed assets, salaries and social security payable and taxes payable are calculated as a historical percentage of sales. This reflects the view that the balance sheet reflects the state of the company's operations.

Retained earnings are calculated as starting retained earnings plus net income less cash dividends and legal funds. Interest-carrying debt and stockholder's equity are held constant since new additions to equity or debt are reflected in excess cash and newly issued debt. Finally, we compare total assets less excess cash, and equity and liabilities less newly issued debt. We then balance the sheet by plugging the difference into the appropriate balance post (excess cash or newly issued debt).

5.3.4 Free Cash Flow

When finding the company cash flows, we start out with earnings before interests and taxes (EBIT). EBIT is found by subtracting depreciations from the operating result.

We calculate the depreciation rate from the historical ratio between depreciations and fixed assets, and use this on the previous years fixed assets to calculate current depreciation.

We calculate taxes using the operating tax rate multiplied with EBIT, because depreciations are tax deductible on the company's hand. EBIT less taxes is known as Net Operating Profit Less Adjusted Taxes (NOPLAT).

Finally, to get to the actual cash flow, we deduct any increases in working capital and capital expenditures, and then add back depreciations (since depreciations are not cash flows and were deducted when calculating EBIT).

Knowing fixed assets at the beginning and at the end of the year, as well as depreciations, capital expenditures are calculated as fixed assets in the beginning of the year- fixed assets in the end of the year + depreciations.

Increased working capital (current assets less excess cash - current liabilities less short term debt) is derived from the difference between previous year's working capital and the current year's. Working capital is current assets and liabilities necessary for the operation of the business. Excess cash is considered a temporary imbalance, and is by definition not necessary to operations. Short term debt is considered a financing effect and should therefore not be considered when finding the company cash flow.

When we have obtained the free cash flows, we convert the amounts into US dollars because we assume the viewpoint of an international investor and, therefore, have to eliminate exchange risk. We use our already calculated forward exchange rates to convert the cash flows. We are now ready to discount the converted dollar cash flows using our dollar-based rates of return.

5.3.5 Discounting the cash flows

To get from the costs of equity to WACC, we need to estimate the companies' debt structures and debt cost. According to the literature²³, we use the book value of the debt (approximates the market value). The market value of equity is found by multiplying total number of shares outstanding by the current share value. Debt cost is calculated by looking at last year's debt cost and total debt.

Now that we have the free cash flows and the WACC, it is straightforward to discount the cash flows. First, we discount the cash flows in the explicit period using the weighted average cost of capital (WACC). This is done by using Gordon's formula. To obtain the end value, we use the free cash flow of the last year of the explicit period, and multiply it with the sustainable growth rate. We forecast the sustainable growth rate by considering how we think the company will grow, on average, from the end of the explicit period and into the future. When the end value is reached, we simply discount this to present date.

²³ (Koller, Goedhart and Wessels, 2005)

By adding discounted end value to the discounted cash flows from the explicit period, we reach the company's total discounted cash flows or the Enterprise Value.

5.3.6 Finding the value

To find the value of the company equity, we start by converting the value of the discounted cash flows (explicit period and end value), the Enterprise Value, from US Dollars back to Pesos. Then we deduct interest carrying debt and excess cash from the Enterprise Value. To get to value per share, we simply divide the company value by total number of shares outstanding.

6 The cost of Capital

The defining of the cost of capital requires much care and effort. Most practitioners using free-cash flow-to-the-firm (FCFF) compute a weighted average of both the cost of equity capital and the debt. This is called the weighted average cost of capital, or WACC. The cost of equity is normally the hardest to obtain. The market for debt is observable, as well as it has a more stable cash-flow which leads to less risk.

An investor will take on the project when the free cash flows generated by the project creates higher value than the initial investment, discounted at the investors cost of capital. That is, the project has a positive net present value (NPV). There is a danger that the overestimation of the cost of capital will lead to positive NPV projects not being undertaken, while underestimation will lead to negative NPV projects being undertaken. Even though different projects can have different risk-profiles, we will anticipate that project-specific risk is diversifiable. As such we anticipate the company cost of equity to be the relevant cost of equity when calculating WACC.

First we will give a short presentation of what makes emerging markets differ from developed markets, the focus being on market integration. One of the main questions when estimating the cost of capital is whether to use a CAPM-based model or not. We

will discuss whether the normal CAPM is applicable in emerging markets, and perform analysis based on different assumptions about the level of market integration. We will also look at modifications that can be made to the CAPM to make it fit better for different levels of integration. As well we will look at another measure of risk, which is called Estrada risk.

We will use weighted average cost of capital, WACC, to discount our cash flows. The WACC formula relies on the assumption of Miller and Modigliani (1958) that the value of a company is indifferent of its financing. The formula leads us to the overall required return on capital of the company. The WACC is the appropriate discount rate for the company as a whole, as well as for projects of the same risk structure and financing as the company.²⁴ The company is financed by debt and equity, both of which have a specific cost associated to them, being the opportunity cost of debt and equity. The opportunity cost of capital is given by the capitals alternative use.²⁵

The formula is given by:

$$WACC = r_{\text{debt}}(1-T_c)D/V + r_{\text{equity}}(E/V)$$

Where:

r = cost of capital

T_c = Company tax rate

D = Market value of debt

E = Market value of equity

V = Market value of company

In the following we will present theory on the calculation of the cost of equity and the cost of debt, including the presentation of different methods that we are going to use further on in our analysis.

²⁴ Investopedia [Internet], <<http://www.investopedia.com/terms/w/wacc.asp>> [Downloaded 25.07.06]

²⁵ Investopedia [Internet], <<http://www.investopedia.com/terms/o/opportunitycost.asp>> [Downloaded 25.07.06]

6.1 The cost of equity

The cost of equity is one of the two cost of capital needed to calculate the WACC used for discounting cash flows. We will present a discussion on whether to use the well known CAPM-framework when estimating the cost of capital or to use other models not based on the CAPM. We will first start with a presentation of market integration, which is of major importance when considering a market's and a company's risk exposure.

6.1.1 Market Integration

When considering the risk exposure in a market, it is important to consider the level of market integration. There are several determinants of capital market integration, such as capital controls (restrictions on foreign capital or ownership, taxes and regulations)²⁶, access to information, timeliness of information, availability and accuracy of accounting standards, lack of institutional structures that protect investors²⁷, and emerging market specific risk, including political risk, macroeconomic instability, and liquidity risk.²⁸

In fully integrated markets, assets of identical risk should yield the same expected return, irrespective of their domicile.²⁹ The common factor of which risk is priced is the covariance with the world market, such as the world market portfolio, world inflation, or world industrial production. The other extreme is the perfectly segmented market, with no covariance with the world market. In this scenario the relevant factor will be the asset's exposure to factors specific to the segmented market.

Bekaert (1995) distinguishes between three sources of barriers to integration. Direct barriers, such as restrictions on foreign ownership and capital controls, indirect barriers, such as poor information and accounting standards and general barriers arising from emerging market-specific risks, such as macroeconomic instability and political risk. These are the risks that make investments in emerging markets different from investments in developed markets.

²⁶ (Nishiotis, 2004)

²⁷ (Harvey, 1994, p. 12)

²⁸ (Nishiotis, 2004)

²⁹ (Bekaert and Harvey, 2003, p. 2)

Emerging markets are normally seen as being somewhere in between the polar extremes when it comes to integration.³⁰ Studies of country risk are normally divided into three broad categories: Those that assume that markets are integrated, those that assume that markets are segmented, and those that assume that markets are partly segmented.³¹ We will use risk measures that take all three positions.

6.1.2 CAPM

The Capital Asset Pricing Model, or the CAPM, is the most commonly method used when estimating the cost of capital in developed markets.³² Even though the CAPM is the main method of use, its usefulness is discussed even there. The CAPM uses historical relationships to estimate the expected return on assets. According to the CAPM-model, the only valued risk is the covariance risk. All other risks are diversifiable, and are not compensated.³³ It is the contribution to the variance of the portfolio that matters when pricing an asset.

It is highly debatable whether the assumptions underlying CAPM are satisfied in emerging markets. The CAPM yields an expected rate of return that is deemed too low to be reasonable (Pereiro, 2002). Ad hoc attempts have been made to add something to the CAPM-based cost of capital. Some of the methods have logical arguments supporting them, but the models are normally without theoretical foundation. The low cost of equity implies that there are unsystematic risk factors in the market demanding a higher pay-off. This may be because of two reasons. Either there are unsystematic risk factors in the market that is priced, or the CAPM is using the wrong measure of systematic risk (wrong measure of covariance).

If a CAPM-model is the choice, the choice has to be made between the following.³⁴

³⁰ (Harvey, 2000 , p. 3)

³¹ (Erb, Harvey and Viskanta, 1997, p. 8)

³² 74 % of firms always, or almost always, use the capital asset pricing model to estimate the cost of capital. See J. Graham and C. Harvey, "The Theory and Practice of Corporate Finance: Evidence from the field," *Journal of Financial Economics* 60, (May/June 2001), pp. 187-244.

³³ (Harvey, 2000, p. 3)

³⁴ (Pereiro, 2002, p.115)

- Deciding the degree of integration
- Deciding the reliability and usefulness of data available for the target country.

6.1.3 Assumptions underlying the CAPM.³⁵

1. Investors are price takers.
2. All investors are short-sighted. Their behavior is myopic.
3. Investments are limited to a universe of publicly traded financial assets, such as stocks and bonds, and to risk-free borrowing or lending arrangements.
4. No taxes on returns and no transaction costs.
5. All investors are rational mean-variance optimizers.
6. All investors analyze securities in the same way and share the same economic view of the world.

In this hypothetical world, the expected return of an asset i is given by: ³⁶

$$E(R_i) = R_f + \beta_i * (E(R_m) - R_f) + R_u$$

Where:

R_f = Risk free rate

$\beta_i = \text{Cov}(R_i, R_m) / \sigma_M^2$ = Covariance between the market and stock i , divided by the market variance. Beta is estimated through regression analysis.

σ_M^2 = Market Variance

$\beta_i * (E(R_m) - R_f)$ = An assets systematic risk

R_u = An assets unsystematic risk. Possible to diversify away given the assumptions.

An assets risk is given by the risk free rate added the risk premium multiplied by the assets covariance with the market divided by the market variance (Beta).

6.1.4 Assumptions and emerging markets

Market efficiency does not usually hold in emerging markets, due to the fact that an emerging market is normally a small market, the relative importance of the stock market

³⁵ (Bodie, Kane and Marcus, 2005, p. 282)

³⁶ For a in-depth analysis of the CAPM model, see Investments.

in the real economy of the country is small, ownership is highly concentrated, information is scarce, unreliable and volatile, the data series to analyze are short and there are few directly comparable companies.³⁷ Emerging markets are typically prone to manipulation as well as they have lower information efficiency than developed markets.³⁸ As a result of this, the straight application of the classical CAPM for defining the cost of equity capital is controversial.³⁹

As well as lack of theoretical foundation, empirical analyses yield the same result. In emerging markets, betas and stock returns are largely uncorrelated.⁴⁰ Harvey (1995) finds that emerging markets have very low betas, which renders the beta to be too low.⁴¹ This in turn leads the risk exposure to be low, leading to a low cost of capital.

One of the characteristics of the CAPM is that it follows from an equilibrium in which investors display mean-variance behavior. It is argued that this is less the case in emerging markets than in developed markets. As such, the CAPM may not be applicable in emerging markets. This will be further discussed under the chapter about D-CAPM. The question of whether CAPM can be applied complicates the matter of defining an appropriate cost of equity in emerging markets.

6.1.5 Why is CAPM still being applied?

Even though the CAPM is highly debatable, it is still used by a majority of the practitioners.⁴² There are mainly three reasons why this is so:⁴³

- There are significant cost benefit reasons to apply CAPM.
- CAPM is the standard benchmark for cooperating and competing firms.
- Some of the problems can be partially alleviated through ad-hoc adjustments (though not theoretically founded).

³⁷ (Pereiro, 2002, p.14)

³⁸ (Bekaert and Harvey, 2002, p. 10)

³⁹ (Pereiro, 2003)

⁴⁰ (Estrada, 2000, p. 3)

⁴¹ (Estrada, 2000, p. 3)

⁴² (Pereiro, 2002)

⁴³ (Pereiro, 2002, p. 107)

Academics will probably prefer statistically powerful design, while practitioners will tilt toward easy-to-use models that render “plausible” or “acceptable” figures for the cost of equity in the sense that the figures align with the analyst’s a priori risk perceptions on the project under appraisal.⁴⁴ It is better being inaccurately correct, than being accurately incorrect.

Global CAPM and Local CAPM are the two extremes of CAPM-based models. It is also possible to use a range of values as the cost of capital. We will consider several models when estimating the cost of capital, based on different assumptions about the integration of the Argentine capital market with the world market. We will base our estimate of the cost of equity on different measures of CAPM-risk, as well as measures of downside risk, which is expected to incorporate the risk encountered in emerging markets better than the CAPM model.⁴⁵

6.1.6 World CAPM

The world CAPM assumes one deeply integrated world market. Originally CAPM was presented and applied in the U.S. market, but later it has been applied to an international setting (Solnik 1974a, 1974b, 1977), and is now called the world CAPM. The world CAPM assumes that an investor can easily enter or leave a country’s market. The level of disagreement about the level of integration in emerging markets, makes this a controversial method to apply in these markets.⁴⁶

The global cost of equity capital is given by:

$$\text{Cost-of-equity capital} = C_e = R_{fG} + \beta_{LG} * (R_{MG} - R_{fG})$$

Where:

R_{fG} = Global risk free rate

β_{LG} = Local asset beta to the world market

R_{MG} = Global market return

⁴⁴ (Pereiro, 2003, p. 13)

⁴⁵ (Estrada, 2006)

⁴⁶ (Pereiro, 2003)

$$\beta_{LG}^*(R_{MG}-R_{FG}) = \text{Risk premium asset } i$$

The model assumes that the assets' sensitivity to the world market, the beta, drives its returns. The model has achieved some merit when applied to developed markets.⁴⁷

Harvey (1995) finds that the use of a world CAPM is predicting too low returns. This means that the risk exposure measured by the model is too low, and that there are sources of risk that is not taken into account.⁴⁸ This problem can be found in a too low estimated beta. It is possible (or even likely) that the beta is either indistinguishable from zero, or negative. The implication is that the discount rate for firms in emerging markets is the U.S. risk free rate, which is obviously problematic.

The results from an analysis based on completely integrated capital markets, which are not completely integrated, may turn out bad.⁴⁹ The model has in fact turned out bad when applied to emerging markets.⁵⁰

There are also other complications that may arise when calculating the world CAPM:⁵¹

- The currency of returns.
- What is the risk-free asset?
- Role of local factors.
- How to define the world portfolio.

These complications will be discussed in the chapter on estimating the cost of equity.

6.1.7 Local CAPM (L-CAPM)

The local CAPM assumes a segmented market. It uses the US risk free rate added a beta country risk premium as the local risk free rate. The local CAPM assumes that the country risk is compensated risk, and as such not diversifiable in a world market. It is an

⁴⁷ (Erb, Harvey and Viskanta, 1997, p. 8)

⁴⁸ (Erb, Harvey and Viskanta, 1997, p. 23)

⁴⁹ (Erb, Harvey and Viskanta, 1997, p. 23)

⁵⁰ (Harvey, 2000, p.3)

⁵¹ (Erb, Harvey and Viskanta, 1997, p. 8)

asset's exposure to a local risk factor that decides systematic risk of an asset. As such the local CAPM tends to overestimate the cost of equity due to the inclusion of a country risk premium.

The cost of equity capital is given by:

$$\text{Cost-of-equity capital} = C_e = R_{fL} + \beta_{LL} * (R_{ML} - R_{fL})$$

$$R_{fL} = R_{fG} + R_C$$

Where:

R_f = Local risk free rate

R_{fG} = Global risk free rate

R_C = Country risk premium

β_{LL} = Local asset beta with the local market

R_{ML} = Local market return

$\beta_{LL} * (R_{ML} - R_{fL})$ = Risk premium asset i

A problem with the local CAPM is that very high volatility in emerging markets renders the computation of market premiums and betas quite complicated. Historical series are highly unstable, and data tend to be unreliable or useless. It is not uncommon to find negative market returns.⁵²

With the local CAPM there is a danger of risk double counting, which means that country risk is accounted for twice (both in the beta and in the country risk premium added to the risk free rate).⁵³

6.1.8 Sovereign Yield Spread Model

The sovereign yield spread model is used by a number of investment banks and consulting firms.

The model suggests estimating individual stocks against S&P500 (or another world market proxy), multiplying the regressor by the expected return on S&P500, before

⁵² (Pereiro, 2003, p. 9)

⁵³ (Pereiro, 2002)

adding a country spread, which is the spread between the country's bond yield denominated in US Dollars and the US Treasury bond yield. The model tries to fix the problem of a too low equity market premium given by the world CAPM-model by adding an extra country premium.⁵⁴ The model also tries to correct for the risk double counting that is a problem under the local CAPM.

The model is intuitive, because it increases an unreasonable low cost of capital. There are on the other hand two problems associated with it.⁵⁵ First, the additional factor is the same for every security, which is unreasonable. Second, and maybe most seriously, the model is only available for countries with US Dollar denominated bonds issued.

6.1.9 Other CAPM-based models

A number of other models try to incorporate the unresolved level of market integration. Some of these try to add a random country risk premium equal for all assets, some try to estimate a relationship between the asset and a risk factor. Some of these models are mentioned in Pereiro (2002). The Adjusted Local CAPM (AL-CAPM) tries to correct the local CAPM with a coefficient that reflects the covariance between the volatility of returns of the local company and the variation in country risk..⁵⁶ The hybrid model (Lessard's Model; Lessard (1996)) uses the US market as a proxy for the global market, then adds a risk premium through a country beta used on US risk premium. This model do not just correct for risk double counting which is a problem with a number of the models based on beta risk.. The Hybrid CAPM (Ibbotson model)⁵⁷ estimates a securities' return minus risk free rate regressed against world market portfolio return minus risk free rate. Beta is then multiplied with world risk premium. This model includes an additional factor (one half of the intercept, which tries to fix the problem of country risk with adding an extra risk premium. There is no theoretical foundation to support this approach, and there is no formal justification for it, on the other hand this model can be applied to a large number of countries.

⁵⁴ (Erb, Harvey and Viskanta, 1997, p. 24)

⁵⁵ (Erb, Harvey and Viskanta, 1997, p. 24)

⁵⁶ (Pereiro, 2003, p. 9)

⁵⁷ (Erb, Harvey and Viskanta, 1997, p. 24)

A model that tries to adjust for risk double counting is the Godfrey Espinosa model. This is achieved by applying a constant coefficient. This coefficient is used on the market equity volatility against the credit quality. Also the Adjusted Hybrid Model tries to adjust for risk double counting by using the true coefficient of determination of the regression between the volatility of returns of the local company and the variation of country risk. Finally, Goldman Sachs uses the correlation between country and market return to avoid the problem of double counting.

6.1.10 Non CAPM-based models

Erb, Harvey and Viskanta (1995) propose a model that does not need an equity market. This model is based on estimating expected return and different risk measures calculated from risk agencies. There are mainly two problems with this method. First, the model yields a countrywide cost of capital, which makes it incorrect on the company level. Second, it yields a highly subjective measure of risk.⁵⁸

Pereiro suggests using EHV only if a capital market does not exist. When a capital market exists, Pereiro suggests using a model called the Estrada model. Argentina has a capital market, and therefore we choose the Estrada model as our non-CAPM based model. The Estrada model also focuses on variance and co-variance between assets and an index. As such the model is based on historical returns and volatility, just like the CAPM.

6.1.11 The Estrada model

Estrada (2000) proposes to use a downside risk measure that replaces beta. The model is defined as the ratio between the semi-standard deviation of returns in market i and the returns in the relevant market. Estrada (2006) states that what investors normally associate as risk, is the risk of bad outcomes. They do not associate risk with large positive returns. Risk is associated with the possibility of a bad outcome, relative to a

⁵⁸ (Pereiro, 2003, p. 12)

benchmark. It is only during the last couple of years that downside risk has become increasingly accepted in both academia and in practice.⁵⁹

Estrada states that there are two reasons why the normal variance of returns is questionable. First, it is an appropriate measure of risk only when the underlying distribution of returns is symmetric. Second, it can be applied straightforwardly as a risk measure only when the underlying distribution of returns is normal. He states that empirical evidence on the subject seriously questions whether this is so.

The semi-variance of returns is a more plausible measure of risk for several reasons. First, investors, as mentioned above, only dislike downside volatility. Second the semi-variance is more useful when the underlying volatility is asymmetric. Third, the semi-variance combines in one measure the information provided by two statistics, variance and skewness, thus making it possible to use a one-factor model to estimate required returns.⁶⁰

Javier Estrada (2000) gives supporting evidence to Harvey (1995), Erb, Harvey and Viskanta (1996a), and Viskanta (1997). They all found that systematic risk is not significantly correlated with stock returns in emerging markets. Total risk, idiosyncratic risk and downside risk comes out significantly. There might be several explanations for the lack of explanatory power of systematic risk for stock returns.⁶¹ First, emerging markets are not fully integrated with the world market. This is in accordance with Bekaert (1995) that mentions the three sources of barriers to entry. Second, the world market portfolio is not mean-variance efficient. Third, misspecification leads to the omission of relevant variables.

Estrada concludes that in emerging markets, the investor is compensated for unsystematic risk (unlike developed markets) because it is not diversifiable. Estrada (2000) shows how the use of total risk gives a cost of equity too high and how the use of systematic risk

⁵⁹ (Estrada, 2006)

⁶⁰ (Estrada, 2002, pp. 366)

⁶¹ (Estrada, 2000, p. 9)

gives a cost of equity too low. Finally he shows how downside risk gives a measure in between the two extremes. The measure reflects the skewness in the distribution of volatility (a large part of the volatility is wanted upside volatility).

According to the standard deviation of returns, an investor owning a stock with a mean annual return of 10 % , will be equally happy for a -5% return as for a 25% return. This is not the case. Estrada states that this is an argument for using the semi-deviation.

Godfrey and Espinosa have proposed to use Estrada risk as an alternative ratio of risk for use in emerging markets.⁶²

We will decide RM_i from the regression of the relationship between the ratio between asset i and the world and the local market for these two benchmarks (B): Return with respect to the mean and return with respect to zero.

The formulas are given by:⁶³

$$C_E = R_{f_{US}} + (R_{MG} - R_{FG}) * RM_i$$

Where:

C_E = Cost of equity capital

$R_{f_{US}} = R_{FG}$ = Risk Free Rate

$(R_{MG} - R_{FG})$ = Market risk premium

RM_i with respect to B:

$$\text{Min}((R_i - B_i); 0) / \text{Min}((R_M - B_M); 0)$$

Where B:

i = Asset i

M = Market (World and Local)

0 = Zero

⁶² The basis for our calculations is Estrada (2006), where he conducts his analysis on a set of companies. His companies are developed market companies. Godfrey and Espinosa (1996) suggests that applying this method in Emerging markets may be of special interest.

⁶³ (Estrada, 2002, pp. 368 – 370)

Benchmark (B) = Mean return:

We will use the regression function $\beta_{i^D} = E[x_t y_t] / E[x_t^2]$ ⁶⁴

Where

$$y_t = \text{Min} [R_{it} - \mu_i, 0]$$

$$x_t = \text{Min} [R_{Mt} - \mu_M, 0]$$

R_{it} = Return asset i, period t

R_{Mt} = Return market, period t

and μ_i and μ_M being the mean of y_t and x_t

This yields the regression function:

$$\beta_{i^D} = E \{ \text{Min} [R_{it} - \mu_i, 0] \text{Min} [R_{Mt} - \mu_M, 0] \} / E \{ \text{Min} [R_{Mt} - \mu_M, 0]^2 \} = E[x_t y_t] / E[x_t^2]$$

The function must be regressed without a constant (that is, the constant equals 0).⁶⁵

Benchmark (B) = 0:

We will use the regression function $\beta_{i^D} = E[x_t y_t] / E[x_t^2]$ ⁶⁶

Where

$$y_t = \text{Min} [R_{it} - 0, 0]$$

$$x_t = \text{Min} [R_{Mt} - 0, 0]$$

R_{it} = Return asset i, period t

R_{Mt} = Return market, period t

This yields the regression function:

$$\beta_{i^D} = E \{ \text{Min} [R_{it} - \mu_i, 0] \text{Min} [R_{Mt} - \mu_M, 0] \} / E \{ \text{Min} [R_{Mt} - \mu_M, 0]^2 \} = E[x_t y_t] / E[x_t^2]$$

The function must be regressed without a constant (that is, the constant equals 0).⁶⁷

⁶⁴ (Estrada,2002, pp. 368 – 370)

⁶⁵ (Estrada,2002, pp. 368 – 370)

⁶⁶ (Estrada,2002, pp. 368 – 370)

⁶⁷ (Estrada,2002, pp. 368 – 370)

6.1.12 The Estrada Model added a Country Risk Premium

We suggest to expand the Estrada risk premium with a country risk premium. This measure is given by:

$$C_E = R_{f_{US}} + (R_{MG} - R_{FG}) * RM_i + R_C$$

R_C = Country Risk Premium

The RM_i calculations will be based on the Estrada Model, and the formulas will equal to the Estrada Model. Adding a country risk premium to the local beta will not make sense, since this is already incorporated in the local risk free rate. We suggest that the country risk premium is given by the sovereign yield spread as in the sovereign yield spread model.

This measure will leave us with a cost of equity based on downside risk. This is thoroughly discussed under the Estrada Model to be a better measure of an investor's perceived risk. We lean on his arguments when arguing for downside risk as a risk measure. The added country risk premium for the world Estrada model yields an expected return taking the asset specific historical downside risk into account, as well as the expected country risk.

The method is intuitive and it is easy to calculate, and we have yet to find this solution in existing literature.⁶⁸

6.1.13 Weighted Value Domestic Sales

We calculate our own cost of equity based on the World CAPM and the Local CAPM costs of equity. As a proxy for a company's exposure country risk, we use share of total sales in domestic markets as weights on the two CAPM-costs of equity. This yields an intuitive result using a proxy to reflect the level of risk exposure to local risk.

The formula is given by:

⁶⁸ See references for reviewed literature.

WeightedValueSalesDomestic $C_E = \text{World CAPM } C_E * (1-\text{STSD}) + \text{Local CAPM } C_E * (\text{STSD})$

Where:

STSD = Shares of Total Sales in Domestic Markets

6.1.14 Equally Weighted cost of Equity Model

Finally we calculate our own cost of equity, using an equally weighted average of the already found costs of equity.

The formula is given by:

Equally Weighted $C_E = \text{Average } (C_E\text{World} + C_E\text{Local} + C_E\text{DownsideWorldMean} + C_E\text{DownsideWorldZero} + C_E\text{DownsideLocalMean} + C_E\text{DownsideLocalZero} + C_E\text{DownsideWorldAddedCountryRiskPremiumMean} + C_E\text{DownsideWorldAddedCountryRiskPremiumZero} + C_E\text{SovereignYieldSpread})$

6.1.15 Conclusion

In a perfectly integrated market, the cost of equity is perfectly measured by the beta to the world market. In a perfectly segmented market, the cost of equity is measured by the beta to the local market. If the stock is considered isolated, the relevant risk is the total risk measured by the standard deviation. The Estrada downside risk measure should be able to capture the different levels of integration.

6.2 The cost of debt

The relevant debt interest rate is the rate at which the company will be able to raise debt in the future. The interest rate used is either the marginal cost of debt or the current cost of debt. If possible, historical cost of debt should never be used when computing the WACC.

In emerging markets, there is no consensus whether to use the marginal or the current cost of debt. The average current cost of debt is what primarily is being used by corporations in Argentina.⁶⁹ In our valuation we will use the average current cost of debt, which is this years interest rate paid divided by average debt through out the year, in accordance with common valuation techniques.

7 Incorporating Unsystematic Risk

7.1 Unsystematic Risk

The last step of the comprehensive fundamentals based approach presented earlier, is to adjust for the effects of unsystematic risk components.⁷⁰ Through this we will be able to calculate the synthetic company value. Questions to raise in this chapter are: What are the specific drivers of unsystematic company risk? How is unsystematic risk computed? What is the size of the risk adjustment, and how can this adjustment be calculated in an emerging market? How are unsystematic risk adjustments transformed into risk premiums and into the discount rate?

The existence, and pricing of, unsystematic risk effects, rests on the assumption that diversification is imperfect. This is normally the case in the world of real assets.⁷¹ The unsystematic risk effects need to be considered together with the cost of capital. There are three ways to account for the effects. The three are directly in the discount rate, as a premium, or simply as a straight adjustment. The unsystematic risk effects are also called idiosyncratic or private risk. This means risk that an analyst thinks is likely to affect the performance of that single company.

According to Pereiro (2002), academics have not yet developed a full set of models to handle the issue of unsystematic risk effects. The CAPM-mindset ignores its design. Much of the accounting for unsystematic risk today is heuristics-based.

⁶⁹ (Pereiro, 2002)

⁷⁰ (Koller, Goedhart and Wessels, 2005)

⁷¹ (Pereiro, 2002, p. 176)

In general, unsystematic risk can be said to be composed of three different value-affecting drivers.⁷² These three are company size, size of the shareholding (minority versus control) appraised and liquidity (or the lack thereof) of the shareholding appraised. We will now in turn discuss these three, with implications for our valuations.

7.1.1 Size Effect

The size effect is the proven (but discussed) fact that smaller firms seems to yield higher returns than larger firms. The rationale behind this effect is that smaller firms are less established and more vulnerable to the liability of their young age than larger, established firms with solid track records and a better credit rating. The presence of a size effect has been established in the literature⁷³, but there is no agreement on the matter.

A 4% risk premium to the discount rate has been argued in the US market to account for the size effect. It is also argued that the effect can be estimated as the spread between the bank rates that companies are offered.

7.1.2 Control Premiums

A majority shareholding is less risky than a minority shareholding. This is due to the control that follows a majority shareholding. A minority interest should as such be worth less than a majority interest in a company. In other words the former should trade at a discount, alternatively the latter should trade with a control premium. The control premiums can be estimated through empirical work on differences in prices in the stock market and prices when a control position of the company stock is transferred in an acquisition.

7.1.3 Illiquidity Discounts

The shares of a quoting company are worth more than the shares of a non-quoting company. This is derived from the rationale that the shares can be rapidly and easily traded in the stock market, with considerable certainty on the realization value, as well as

⁷² (Pereiro, 2002, p. 177)

⁷³ (Pereiro, 2002, p. 178)

with the minimum transaction costs. For a private, non-quoting company, finding a new stock-owner can be a difficult task, and may never even succeed. Also, other factors play a role when considering illiquidity: Dividend payments, number of potential buyers, probability of going public and the differences in the quality of information. These illiquidity risks all translate into a discount on the price at which the shares are traded.

7.2 Adjustments for unsystematic risk effects

We assume that CAPM-based models incorporate the systematic risk effects present in the relevant market. This leaves us with having to account for all unsystematic risk effects in the pricing of a company. The Estrada model, on the other hand, certainly captures a portion of the unsystematic risk.⁷⁴ Data on the returns come from the stock market, where, by definition, only minority shareholdings of quoting companies are traded. It is reasonable to assume that the model already incorporates the size effect (plus any other unsystematic risk factor), with the exclusion of control and illiquidity effects. We conclude that the size effect is accounted for. The control premium is not relevant, since we are not valuing a company for an acquisition of a majority position in the company, which would result in a control premium, but for investment purposes on a minority position basis. We are valuing large companies, all traded on the Argentine stock exchange. As such we consider the information-efficiency of the companies to be good.

We argue that there is a difference between the unsystematic risk effects on the company level and on the country level. We conclude that our companies have no relevant unsystematic risk effects relevant for the companies alone. The relevant unsystematic risk effects, if any, are present on the country level, and taken care of through our different costs of equity.⁷⁵

⁷⁴ (Pereiro, 2002, p. 182)

⁷⁵ See discussion of unsystematic versus systematic risk in the paragraph on market integration under the chapter The Cost of Capital.

8 Estimating the Cost of Capital

8.1 Estimating the cost of equity

8.1.1 Collection of Data

Time series data are downloaded from Datastream and Yahoo Finance. We apply time series adjusted for splits and dividends.

8.1.2 Risk Free Rate

We are using the U.S. 10 year Treasury bond as world risk free rate. Pereiro (2002) finds it strange that most companies in Argentina use an US interest rate as basis for risk free rate, even though they use local currency as a reference. We will take the perspective of an international investor, as such we are using U.S. 10 year Treasury bond rate as the global risk free rate. An option would have been to use U.S. 30 year Treasury bond. We argue that 10 year is a more realistic time frame for most investors. This is in accordance with typical investment practice.⁷⁶

As a local risk free rate we are using the world risk free rate and adding a country risk premium, in accordance with the equation given for the local CAPM. As a proxy for the country risk premium we use the sovereign yield spread. The sovereign yield spread is the difference in yield between a US bond and a local bond denominated in US dollars and of the same maturity. A newly issued local US Dollar denominated bond (30 year, PAR bond) is selling with a premium of approximately 3,7% over a US similar bond.⁷⁷

8.1.3 Market risk premium

We are using the average historical return above risk free rate as the market risk premium when estimating the world CAPM. Koller, Goedhart and Wessels (2005) suggest using 5-6%. We are using 5,5 %, which is in accordance with this.

⁷⁶ (Brealey, Myers and Marcus, 2004)

⁷⁷ www.cbonds.com [Internet]

In the Latin American emerging economies, computing the local market risk premium is a difficult task, given the high volatility of the financial environment. This is mostly due to the short time series and volatile settings.⁷⁸ Country-idiosyncratic risk premiums are usually employed by Argentine appraisers. We are incorporating a country specific country risk premium through the sovereign spread in the sovereign spread model, and through the local market risk free rate in the local CAPM. Considering the volatility in the time series data on Argentine average historical return (different time-periods yields substantial differences), we calculate the market risk premium as the sovereign yield spread multiplied by the relative volatility between the Argentine market and the world market. This is in accordance with Pereiro (2002).

8.1.4 Indexes

We are using MSCI AC World as a world market proxy and the volume weighted Merval index as the relevant Argentine index.⁷⁹ Both of these are price indexes, adjusted for dividends and splits.

8.1.5 Returns

We are using the natural logarithm return (dlog returns) when estimating betas. We calculate annualized average return based on the natural logarithm weekly returns. We are also using the weekly logarithm returns when calculating the annualized volatility of the time series.

8.1.6 Number of representations

80-100 representations are mentioned as a perfect number when doing estimates on financial data.⁸⁰ We therefore perform regressions using approximately this number of representations.

⁷⁸ (Pereiro, 2001, p350)

⁷⁹ Pereiro (2002) states that most practitioners doing valuations in Argentina are using the Merval index as the local market index.

⁸⁰ See Lecture notes, Methods of Financial Economics, Fall 2004.

8.1.7 Statistical tools used

We are using the regression function in Microsoft Excel to estimate betas and calculating average returns.⁸¹

8.1.8 Time Periods

For all four companies we use two time periods when estimating betas. We are using one short time period and one longer time period. The short time period is from mid 2002, which is when the Argentine economy seemed to stabilize after the early 2001 crisis (when we look at the time series data, we find that the data looks more stable). The long time period is as long as possible. As can be seen in the estimations, the differences are minor. We will as such not discuss the difference between the time periods further.

The yield spread could also have been used for finding the stabilization of the Argentine economy. This exercise renders us with the period after June 2005 (where we find an obvious shift, from 6607 to 910 basis points in the Argentine yield spread over US bonds), which is too short to estimate betas.

8.2 Estimation

8.2.1 Estimating the World Beta

We are estimating beta using weekly returns on the stock and weekly returns on MSCI World (same period), using as long periods as possible.⁸² We do not subtract the risk free rate, because we want consistency between the calculation of the world beta and the local beta. In the local market the historical risk free rate is extremely volatile, and it renders shifts in the time series data when calculating excess returns. As such it is not possible to subtract the risk free rate from returns in the local market. We estimate two world betas for two different time periods as explained above.

US dollar returns is used when estimating the world beta. We are using the Buenos Aires stock exchange returns. The US dollar stock returns are calculated using the exchange rate at the time.

⁸¹ The calculations can be found in the xls-files (Appendices). Beta-regressions can be found in the named worksheets in the files. The name explains which beta-regression that is conducted.

⁸² See Appendix: "IRSA, Average Return and Beta.xls" and Siderar, Average Return and Beta.xls"

8.2.2 Estimating the Local Beta

We estimate company betas using weekly returns on the stock and weekly returns on the volume weighted Merval index.

As with the world beta, we are using two time periods when estimating the local beta. The first is the longest possible, depending on the company. The second is, as with the world beta, based on time series data after the stabilization of the economy mid 2002.

For an international investor the dollar return is more interesting, and as such we are using US Dollar returns when estimating betas. Doing this, we assume that there are no restrictions on capital flows in the segmented market.

8.2.3 The Sovereign Yield Spread

We are using a sovereign yield spread of 3,7 % which is the current spread on a 10 year global bond. We are further using the global beta and the global risk premium when calculating the cost of capital.

Latin Focus reports Moody's, Fitch and S&P spreads. These are in correct order: B3, DDD and B-. This is in accordance with a sovereign yield spread of between 4,25 and 10 %. We are not sure whether these measures are updated lately, and considering the positive trend we will use the 3,7 %.⁸³

8.2.4 The Estrada Model

We will calculate semi deviations with respect to two different benchmarks for the world market, the local market and the stock. We will estimate downside betas between the

⁸³ www.cbonds.info [Internet]

stock and the two markets. The two benchmarks are the mean return (leaving us returns below the mean) and zero (leaving us negative returns).

We will not estimate the Rf downside beta, as is done in Journal of Applied Finance.⁸⁴ The historical Argentine risk free rate is volatile and is not possible to base regression upon.

8.2.5 *The Estrada Model added a Country Risk Premium*

The cost of equity will be based on the Estrada Model. We then add a country risk premium, being the sovereign yield spread. We only use the world Estrada Model, because the local Estrada model already includes the country risk premium.

8.3 WACC

We use each company's corporation tax, cost of debt, the relevant cost of equity and the $(\text{Debt})/(\text{Debt} + \text{Equity})$ to calculate the WACC according to the presented theory. We also use the companies' share of total sales in domestic markets.

⁸⁴ See Estrada (2006)

9 IRSA

9.1 Company outlook IRSA

IRSA was founded in 1943. Today it is the largest and most diversified real estate investment company in Argentina and the only Argentine real estate company listed on the Bolsa de Comercio de Buenos Aires and the New York Stock Exchange. IRSA is engaged directly or indirectly through subsidiaries and joint ventures in a range of real estate activities in Argentina.

Their principal activities consist of:

- The acquisition and development of residential properties primarily for sale.
- The acquisition, development and operation of office and other non-shopping centre retail properties primarily for rental purposes.
- The acquisition, development and operation of shopping centre properties.
- The acquisition and operation of luxury hotels.
- The acquisition of undeveloped land reserves for future development or sale.
- Credit card operations. In 1998, IRSA acquired an 80% equity interest in Tarshop S.A. which is a limited purpose credit card company engaged in credit card operations and is not affiliated to any bank and bears all of the credit and collection risk inherent in extending credit to its customers.

During 2005, all of IRSA's business units have improved their performance considerably, mainly due to excellent strategy decisions in the event of the Argentine economy, which included the recovery of the consumption credit, of salaries, and investment.

This circumstance was reflected in IRSA's results, as shown by the significant increase in operating income. The growth is a consequence of an increase in operative results registered during fiscal year 2005 of shopping centres, hotels, sales and developments.

9.2 Risks

9.2.1 Risks Related to Argentina

IRSA's peso-denominated assets (which represent 91% of their total assets as of June 30, 2005) have depreciated against their debt denominated in foreign currency. As of June 30, 2005, IRSA had outstanding debt amounting to Ps. 483.7 million, of which 89% was denominated in U.S. Dollars. Any further depreciation of the Peso against the U.S. Dollar will therefore increase the amount of their debt in Pesos, with dramatic effects on operating results and the general financial condition. Because of this, IRSA has considerable foreign exchange risk, which means that IRSA to a great degree depend on Argentine macroeconomic and political conditions. Also, a depreciation of the Peso would have particular impact on revenues collected for services provided in Argentina, such as lease agreements and assets' valuation.

High levels of inflation lead to a reduction of real wages. A reduction in wages changes the Argentine consumer behaviour. So, if inflation should rise dramatically, this would have a dramatic effect on IRSA's shopping centre and real estate business. Also, if the inflation rates increase significantly, investment and economic activity will contract, unemployment will increase beyond current levels, tax collection will drop and the current fiscal surplus will erode, leading to fiscal deficit.

9.2.2 Governmental actions to achieve its proposed goals

The government's actions concerning the economy, including the ones with respect to inflation, interest rates, price controls, foreign exchange controls and taxes, have had, and may continue to have, a significant effect on private companies, such as IRSA. Decisions with regards to those issues could have a negative impact on investment and consumption decisions causing a reduction in retail sales, real estate sales and demand for office and commercial space.

Future exchange controls may prevent IRSA from servicing their foreign currency denominated debt obligations. Due to the current social and political crisis, investing in Argentina also entails the following risks:

- Civil unrest, rioting, looting, nation-wide protests, widespread social unrest and strikes.

- Expropriation, nationalization and forced renegotiation or modification of existing contracts.
- Taxation policies, including royalty and tax increases and retroactive tax claims.

9.2.3 Risks Related to IRSA

IRSA's high level of debt may adversely affect their operations and their ability to pay their debt as it becomes due. IRSA is expected to have large liquidity requirements to finance their business.

The fact that they are highly leveraged may affect their ability to refinance existing debt or borrow additional funds to finance working capital, acquisitions and capital expenditures. If they cannot obtain future financing, they may have to delay or abandon some or all of their planned capital expenditures, which could adversely affect their ability to generate cash flows and repay their obligations.

They are subject to risks affecting the hotel industry. The full-service segment of the lodging industry in which they operate their hotels is highly competitive. The operational success of hotels is highly dependant on the ability to compete in areas such as access, location, quality of accommodations, rates, quality food and beverage facilities and other services.

The shopping centre business is subject to competitive pressure. To date, there have been relatively few companies competing for shopping centre properties, and, as additional companies become active in the Argentine shopping centre market in the future, such competition could have a material adverse effect on results

In the end of 2005, the real estate business regained strength in all of its segments. Construction has increased and the retail market is improving, mainly in the shopping centre segment, driven by the increase in consumption in the highest purchasing power sectors and the increased inflow of tourists. These conditions also favoured the hotel segment, which took advantage of Dollar revenues versus Peso costs. Moreover, those companies which after the devaluation had been forced to move their offices to cheaper

areas as part of their cost cut down strategy, have now returned to the more expensive areas encouraged by rising, but still low, prices. Any decrease in investment and consumption decisions could cause a reduction in retail sales, sales of real state and demand for office and commercial space.

The cash flow generation from IRSA's operations is growing at different paces according to each segment. The shopping centre segment experienced the greatest recovery, reaching high occupancy and low default rates that surpassed historical records. Hotels have also shown improvement in both tariffs and occupancy levels. Offices recorded sustained increases in occupancy rates and prices, the sales value of property in the locations where IRSA's developments are established has been escalating, and there has been considerable increase in the demand for such properties. This activity, however, has not been fully reflected in terms of value.

9.2.4 Conclusion

For the moment, IRSA doesn't compete in a fiercely competitive market. However, due to favourable market conditions, we expect new competitors to enter the market since there are relatively few barriers of entry. IRSA's performance is to a large degree dependent on the economic conditions in Argentina. We therefore assume that IRSA in the long run will grow in the same pace as the Argentine GDP. Due to the recent upswing in the Argentine market and the favourable outlook, we are not concerned about governmental regulations ruining business opportunities. We are not concerned about currency risk because we think the currency will appreciate and thereby reduce the debt burden. Inflation could be a problem in the short run, but with the other macroeconomic variables being favourable, we think the macroeconomic environment should support IRSA's growth, especially, we think current GDP growth and lack of competition will create strong growth over the next couple of years.

Excellent market conditions and IRSA's strategic positioning, leads us to estimate real revenue growth over the next five years to 20% the next two years, 10% the following three years, and then start to fall to a sustaining level, matching the inflation (4%)

Growth forecasts, IRSA						
	2006	2007	2008	2009	2010	2011
Real growth	20%	20%	10%	10%	10%	5%
Inflation	15%	10%	10%	10%	8%	5%
Nominal growth	38,0%	32,0%	21,0%	21,0%	18,8%	15,5%

9.2.4.1 Gross/Sales

From the historical data we see that this ratio is lagging behind revenues. We therefore expect to see this ratio to peak two years from now, and then start declining. However, we don't believe it will fall below 50%, due to improved cost control.

9.2.4.2 S/Sales and A/Sales

Company growth increases economies of scale and reduces fixed costs per peso earned. This lowers the S&A costs somewhat.

9.2.4.3 Growth, Gain in credit card

We believe this segment will see a dramatic increase in revenues due to economic expansion and synergy effects from integrating the credit card service into the company's shopping centres. We expect to see a tremendous growth in the credit card operation. Our view is based on the fact that the operation is now established, low operating costs and a big market potential that's readily available (people using IRSA shopping centers).

9.2.4.4 Fix ass/sales

We assume this ratio will remain high given the nature of the business. However, as the development of the properties increases the real estate portfolio revenues, we think the ratio will decline to a sustainable level of 200%.

9.3 Valuation⁸⁵

1996 - Today	CAPM		Downside Beta				Downside Beta and added country risk		
	World	Local	World		Local		World		
	β_{World}	β_{Local}	β_U	β_0	β_U	β_0	β_U	β_0	
CE:	10,9 %	14,7 %	12,8 %		13,2 %	15,9 %	16,0 %	16,4 %	16,8 %
WACC	9,8 %	12,4 %	11,2 %		11,4 %	13,3 %	13,4 %	13,7 %	13,9 %
Share value:	8,8	3,7	5,6		5,3	2,7	2,6	2,3	2,1

1996 - Today	Sovereign Yield Spread	Weighted value sales domestic:	Equally weighted value:
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	β_{World}		
CE:		14,5 %	14,7 %
WACC		12,3 %	12,4 %
Share value:		3,8	3,7

July 2002 - Today	CAPM		Downside Beta				Downside Beta and added country risk		
	World	Local	World		Local		World		
	β_{World}	β_{Local}	β_U	β_0	β_U	β_0	β_U	β_0	
CE:	10,6 %	13,6 %	11,9 %		11,4 %	15,4 %	15,6 %	15,5 %	15,0 %
WACC	9,6 %	11,7 %	10,5 %		10,1 %	12,9 %	13,1 %	13,0 %	12,6 %
Share value:	9,5	4,8	7,0		7,9	3,1	2,9	3,0	3,4

July 2002 - Today	Sovereign Yield Spread	Weighted value sales domestic:	Equally weighted value:
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	β_{World}		
CE:		14,2 %	13,6 %
WACC		12,1 %	11,7 %
Share value:		4,2	4,8

From our valuation in excel, we obtain a range of share values, spanning from 2,1 to 9,5. Looking at the last quoted share value, 3,35, we conclude that our results are in accordance with the market. We observe that the “local” costs of equity (which assume segmented markets), yield share values that matches observed stock prices better than the “world” costs of equity.

The equally weighted equity costs returned share values close to observed share prices, as were the case for the weighted cost of equity (which gives same results as the local CAPM considering IRSA has a 100% share of total sales in domestic markets). The costs

⁸⁵ For the beta estimations, cost of equity calculations and valuations see Appendix IRSA. The complete results can be found in the Appendix IRSA found as an appendix to this paper, while the calculations and results are attached electronically on a CD.

of equity using the time series from 1996-today consistently yielded share prices closer to observed share values than the 2002-today time-series.

In our cost of equity calculations where we have estimated betas⁸⁶, we find that the estimations of local betas (CAPM and Downside beta) yield a higher R² than the estimations of world betas. This means that the stock seems to trail the local market index more closely than the world market index. It can be argued that the stock is priced accordingly to existing country risk factors and that the Argentine market clearly is not fully integrated with the world market.

10 Siderar

10.1 Company outlook Siderar

Ternium Siderar is Argentina's largest steel company. It manufactures hot rolled, cold rolled, hot dip galvanized, electro galvanized, pre-painted and tinsplate steel sheet products.⁸⁷ It has five manufacturing centres in the province of Buenos Aires. Siderar has its own network of points of sale throughout Argentina and also uses the Ternium network of sales offices based in the world's top consumer capitals.⁸⁸

10.1.1 Demand

Siderar operates in the domestic market and the world market, the domestic market being the most important for the moment (70% of sales in 2005). The demand for Siderar's products domestically depends on factors such as GDP growth, particularly the level of activity in the industry and constructing sector. We expect GDP to grow 6 % annually over the next years. The global steel business has entered a new phase characterised by increased demand from the Asian market due to growth in China, and increased M&A-activity as a result of the companies' need to reduce the price volatility through consolidation. Although the growth in demand from China is slowing down, India is expected to step up and ensure continued strong demand. The world economy is currently strong and is expected to stay strong with high industrial activity over the next years. The

⁸⁶ Appendix IRSA Cost of Equity

⁸⁷ SIDERAR Website, <http://www.ternium.com/en/uproductivas/siderar/default.asp> [Downloaded April 19 2006]

⁸⁸ MEPS Website, <http://www.meps.co.uk/article-global2008.htm> [Downloaded April 20 2006]

last five-year global business cycle started its upswing in 2002. A potential problem is the high oil prices, which could have a negative effect on the world's leading economies (U.S. and Europe).⁸⁹

A leading independent supplier of steel market information, MEPS, estimates an average annual increase of almost three percent over the next three years.⁹⁰ This modest prediction is based on two key factors. Firstly, low interest rates and fear of raw material shortage has driven the business to build inventories. This means that demand growth over the last years has been above real demand, and that the growth should decline somewhat over the years to come. Secondly, we may see a decline in the Chinese demand growth due to the government's wishes to cool down the overheating economy (by reducing growth in key industrial sectors such as steel).⁹¹

10.1.2 Supply

Siderar's operating profit was in 2005 practically unchanged from 2004, despite the fact that revenues rose by 20%. This was because of increasing costs due to higher wages and more costly raw materials according to themselves. The markets for raw materials for the manufacture of steel were characterized by significant price rises, mainly of iron ore, coal and coke, there have also been sharp increases in freight costs. These increases have in part been due to growing demand from China, the United States and Europe. In addition, there have been logistical constraints and supply problems affecting certain leading suppliers. These concerns must be monitored.

10.1.3 Existing and potential Competition

As the business worldwide is in a phase of consolidation, combined with strong, sustained growth in demand, competition should decrease for an international, expanding

⁸⁹ Goldman Sachs Global Economic Website [Internet]

⁹⁰ MEPS Website, <http://www.meps.co.uk/article-global2008.htm> [Downloaded April 20 2006]

⁹¹ Wikipedia [Internet], <http://en.wikipedia.org/wiki/Global_steel_industry_trends> [Downloaded 26.07.06]

player like Siderar. Also, the risk of potential entrants to the business is low since large barriers of entry exist.

10.1.4 Conclusion

Siderar is strategically well situated to face global competition. Due to recent expansion, the company should be able to cut costs and realize synergies. Also, revenues are expected to boost due to favourable domestic and global market conditions. This should dramatically increase profitability over the next five years, when we expect revenues to grow at the same pace as inflation. We expect nominal revenue growth to be in the range between 55% and 20% over the next years, continuing the strong growth from 2005.

Growth forecasts, Siderar						
	2006	2007	2008	2009	2010	2011
Real growth	15%	10%	5%	5%	5%	2%
Inflation	15%	10%	10%	10%	8%	5%
Nom. growth	32,3%	21,0%	15,5%	15,5%	13,4%	7,2%

We apply historical ratios to forecast the relationship between various figures such as intangible assets/sales, fixed assets/sales, and non-operating income/investments.

10.2 Valuation⁹²

1996 - Today	CAPM		Downside Beta				Downside Beta and added country risk		
	World	Local	World		Local		World		
	β_{World}	β_{Local}	β_U	β_0	β_U	β_0	β_U	β_0	
CE:	9,4 %	16,7 %	13,0 %	13,0 %	17,5 %	17,3 %	16,6 %	16,6 %	
WACC	8,5 %	14,1 %	11,3 %	11,3 %	14,7 %	14,6 %	14,0 %	14,0 %	
Share value:	26,8	7,5	13,4	13,5	6,7	6,8	7,6	7,7	

1996 - Today	Sovereign Yield Spread	Weighted value sales domestic:	Equally weighted value:
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	β_{World}		
CE:		13,0 %	11,6 %
WACC		11,2 %	10,2 %
Share value:		13,5	17,2

July 2002 - Today	CAPM		Downside Beta				Downside Beta and added country risk		
	World	Local	World		Local		World		
	β_{World}	β_{Local}	β_U	β_0	β_U	β_0	β_U	β_0	
CE:	6,8 %	15,7 %	10,8 %	9,9 %	17,2 %	16,8 %	14,3 %	13,5 %	
WACC	6,6 %	13,3 %	9,6 %	8,9 %	14,4 %	14,2 %	12,3 %	11,6 %	
Share value:	53,6	8,8	20,0	23,8	7,0	7,4	10,8	12,4	

July 2002 - Today	Sovereign Yield Spread	Weighted value sales domestic:	Equally weighted value:
-------------------	------------------------	--------------------------------	-------------------------

	β_{World}		
CE:		10,4 %	9,5 %
WACC		9,3 %	8,6 %
Share value:		21,5	26,1

From our valuation in excel, we obtain a range of share values, spanning from 6,7 to 53,6. Looking at the last quoted share value, 23,85, we conclude that our results are in accordance with the market. Obviously, we have got some extreme values in our results. We think the world CAPM in this case produces a too low WACC, and should be discarded from further analyses. We observe that the “world” costs of equity (which assume integrated markets), yield share values that matches observed stock prices better than the “local” costs of equity. This is an appealing result, because the company has 70% total sales are exports, and therefore should be less influenced by the not perfectly integrated Argentine market.

⁹² For the beta estimations, cost of equity calculations and valuations see Appendix Siderar. The complete results can be found in the Appendix Siderar found as an appendix to this paper, while the calculations and results are attached electronically on a CD.

The equally weighted equity costs returned share values far off observed share prices, but the weighted cost of equity gives results more in accordance with the market (according to international sales vs. total sales). The costs of equity using the time series from 1996-today consistently yielded share prices closer to observed share values than the 2002-today time-series.

11 Cresud

11.1 Company outlook Cresud

11.1.1 *Corporate profile*

Cresud is one of the largest agribusiness companies in Argentina (the only company in this sector listed on the Bolsa and on the NASDAQ in the US). Cresud is involved in operations such as crop production, cattle raising and fattening, milk production and forestry activities. Also, they sell farmland now and then, in order to profit from land appreciation. Cresud owns 17 farms and leases another 22 farms, most of them situated in Argentina's pampas. The company has since 1994 transformed into a Real Estate Investment Trust (REIT) in the Argentine rural sector, based on an aggressive policy of investment in land, technology and beef cattle. The corporate strategy is to strengthen their position as a leading Argentine agricultural company through five corporate goals:

- Acquiring and leasing farmland to support growth strategy and increase level of flexibility in operations. Thereafter, increase production by transforming non-productive underutilized land and farmland in marginal areas into cattle raising lands and/or agricultural farmlands. This will be accomplished through introduction of new technologies
- Optimizing yields by using modern technologies and methods such as modern machinery to enhance crop production, irrigation equipment, improve crop yields by using high-potential seeds and fertilizers, advanced land rotation techniques, advanced breeding techniques and animal health-related technologies, improve the use of pastures, continue investing in infrastructure (water supply facilities, electric fences, etc.), a new, large-scale milk production plant and advanced feeding and animal health techniques.
- Diversification with respect to product mix and the geographical location of farmlands. This will reduce the two major risks associated with the business, climate and the fluctuations of commodity prices. There are also plans to expand into processing of their products (vertical integration).

- Acting as a real estate investment vehicle in Argentina by controlling a major share in IRSA (IRSA is the largest real estate investment company in Argentina).
- Realizing farmlands after their appreciation. Land values have surged during the new growth stage and are now above the levels recorded before the devaluation of the peso. This is due to the limited land available for sale (high yields) and the increase in demand (perceived to be safer than other traditional forms of investment).

11.1.2 Future prospects

Future operating results may be affected by certain risks, such as macroeconomic factors, commodity prices, and unfavourable weather conditions. Other factors which may affect results are increased competition, and whether or not the expansion goes as planned.

11.1.3 Macroeconomic outlook

Cresud collects most of their revenues in peso, while some of their loans are in US\$, making the company vulnerable to Argentine economic conditions and foreign exchange risk. Especially economic growth and inflation could have dramatic impacts on results. If GDP growth declines and/or inflation levels rise, we should see increased unemployment, leading to lower demand for their products. Also, the Argentine government talks about initiating price controls on necessary items (such as grain, beef and milk) as a way to fight inflation. This may have a dramatic effect on operating results. Other effects of negative economic growth and inflation include rioting, looting, nation-wide protests, strikes and widespread social unrest, expropriation, nationalization and unpredictable taxation policies.

11.1.4 Commodity prices

To minimize risks associated with price factors, Cresud apply hedging by means of futures and option agreements in the grain market. But, due to the fact that they don't have 100% of their crops hedged, they are exposed to significant risks associated with the

level and volatility of crop prices. Prices for cereals, oilseeds and by-products, like those of other commodities, can be expected to fluctuate significantly. The prices depend on many factors including: current world prices, changes in the agricultural subsidy levels of certain important producers (mainly the USA and the European Union) and demand for and supply of competing commodities and substitutes.

	Total sales					
	Year ended June 30,					
	2003 ⁽¹⁾		2004 ⁽¹⁾		2005 ⁽¹⁾	
	(Ps. 000)	%	(Ps. 000)	%	(Ps. 000)	%
Crops:						
Wheat	5,965	7.5	5,613	8.1	4,708	6.0
Corn	16,368	20.6	6,177	8.9	7,813	10.0
Sunflower	3,139	3.9	1,885	2.7	1,519	1.9
Soybean	21,361	26.8	11,375	16.3	15,116	19.4
Other	3,334	4.2	1,788	2.6	1,737	2.2
Total crops	50,167	63.0	26,838	38.5	30,893	39.5
Beef-cattle.....	20,566	25.8	27,724	39.8	36,827	47.1
Milk	2,415	3.0	3,192	4.6	3,463	4.4
Feed lot.....	4,453	5.7	7,120	10.2	2,130	2.8
Other.....	1,985	2.5	4,779	6.9	4,860	6.2
Total Sales.....	79,586	100.0	69,653	100.0	78,173	100.0

Total sales Cresud⁹³

As can be seen in total sales for Cresud, beef cattle, soy bean and corn are the three most important products in Cresud's portfolio.

11.1.5 Corn

The United States Department of Agriculture (USDA) projects a world corn production of 649.5 million tons for 2005/06 season, 8% below the all-time record of 706 million tons in the season 2004/05. World supply is below demand, which should result in decreasing inventories and rising prices.⁹⁴ The Argentine production is likely to decline to 18.5 million after hitting a record high of 19.5 million in the 2004/05 season. This decline is attributable to lack of humidity conditions necessary for this crop and adverse climate conditions. Export projections stand at 13 million tons. The report states that

⁹³ <www.cresud.com> [Internet] [Downloaded 26.07.06]

⁹⁴ <<http://usda.mannlib.cornell.edu/reports/waobr/wasde-bb/2006/wasde436.pdf>> [Internet] [Downloaded 14.07.06]

exports from Argentina will continue to grow and compete against the US, while China should become a net importer of corn as from the 2007/08 farm season.⁹⁵

11.1.6 Soybean

The USDA projects a global production of 219.7 million tons for the 2005/06 season. With consumption projected to increase by 10 million to 213 million, we expect to see increase in inventories and declining prices. In Argentina, production is projected to stand at 39.9 million tons- a rise of 900,000 tons on the previous season. The surge in oil prices is leading United States and Europe to invest in bio diesel. This is produced out of soybean or sunflower. Demand for these commodities should have bright prospects.⁹⁶

11.1.7 Beef cattle

The country has managed to control the hoof and mouth disease and its implications for foreign trade. This created favourable conditions for beef cattle exports, which led to many meat packing plants being reopened and personnel being rehired. Cattle prices are increasing, after having bottomed out in December 2002 – a year marked by the FMD epidemic. The rise in the price of cattle is mainly due to two factors: a decrease in supply and the rise in export. A strengthened exports market and a strong domestic market (85% of the country's production is sold in the domestic market, as Argentines top the world's beef consumption list with 66kg/person per year in 2004) leads us to an optimistic view on this sector.⁹⁷

11.1.8 Weather conditions

The occurrence of severe adverse weather conditions, such as droughts and floods, is unpredictable and may have a dramatic impact upon crop production and, to a lesser extent, beef-cattle production. Cresud use geographical diversification as a mean of hedging against weather conditions.

⁹⁵ <<http://www.ers.usda.gov/Briefing/baseline/present2005.htm>> [Internet] [Downloaded 10.05.06]

⁹⁶ <<http://www.ers.usda.gov/Briefing/baseline/present2005.htm>> [Internet] [Downloaded 10.05.06]

⁹⁷ <<http://www.ers.usda.gov/Briefing/baseline/present2005.htm>> [Internet] [Downloaded 10.05.06]

11.1.9 Competition

Cresud is among the biggest players in the market, but because of a big number of players, they have a low market share. However, they do have some bargaining power when it comes to suppliers and customers. Until now, there has been limited competition in the market for acquisition and leases of farmlands for the purpose of benefiting from land appreciation and optimization of yields in agricultural activity. Seeing the favourable market conditions, we expect to see the entrance of new players to the market in the coming years.

11.1.10 International market

Although the entire production is sold on the domestic market, a major part of is shipped out by exporting firms. One therefore needs to consider the worldwide competition in each market and product line. The market for cereals, oil seeds and by-products is highly competitive and also sensitive to changes in industry capacity and cyclical changes in the world's economies. Expectations on the opening of the U.S., Mexican and Canadian markets after the control of the hoof and mouth disease, should contribute to increase sales. These three markets are supposed to open in 2006. As a result of this, we expect increased sales volume and a rise in the beef prices.

11.1.11 Expansion Strategy

Cresud has obtained a butcher's license, in order to slaughter and export beef on behalf of third parties. Cresud has decided to expand operations outside of Argentina, taking advantage of opportunities in different countries of Latin America. Cresud is currently planning to invest in the Brazilian agriculture market. Cresud will continue to acquire farms located in marginal areas with high productive potential.

11.1.12 Concluding remarks

Growth forecasts, Cresud

Corn	2006	2007	2008	2009	2010	2011
average	246,13	284,75	307,88			
price growth	8,31 %	15,69 %	8,12 %	2,00 %	2,00 %	2,00 %
volume	10,00 %	10,00 %	15,00 %	15,00 %	10,00 %	3,00 %
Inflation	15%	10%	10%	10%	8%	5%
Revenue growth	37,01%	39,98%	36,77%	29,03%	31,18%	10,31%
Soy bean	2006	2007	2008	2009	2010	2011
Average	610	640	660			
Price	2,43 %	4,92 %	3,13 %	2,00 %	2,00 %	2,00 %
Volume	10,00 %	10,00 %	10,00 %	5,00 %	5,00 %	5,00 %
Inflation	15%	10%	10%	10%	8%	5%
Revenue growth	12,68%	15,41%	13,44%	7,10%	7,10%	5,0%
Cattle	2006	2007	2008	2009	2010	2011
Price	4,75 %	4,09 %	2,00 %	2,00 %	2,00 %	2,00 %
Volume	20,00 %	20,00 %	10,00 %	10,00 %	5,00 %	1,00 %
Inflation	15%	10%	10%	10%	8%	5%
Revenue growth	44,56%	43,64%	23,42%	23,42%	15,67%	8,17%

11.1.12.1 Operating income

We estimate strong revenue growth for the three main segments. We forecast no strong growth for the other segments. In stead, we believe that these product groups should fluctuate around their current levels of revenue. We believe the sustainable growth level equals inflation, 4%.

Operating costs are derived from sales, but we divide the costs into different cash flows and link them to their respective revenue driver. We then let the ratio decline over the years to come, reflecting increased economies of scale resulting from expansion in operations.

11.1.12.2 Number of sales and profit/sale

We believe Cresud will continue its policy of selling off land that has been developed and/or appreciated in value. We think they will sell two or three properties per year

(historical rate), receiving a profit in the range 2.5 million to 10 million per property sold, depending on real estate market at the time of the sale. We expect to see generally higher profits, due to increased degree of land development (resulting in higher prices).

11.1.12.3 Gain from inventory holding

We forecast gain from inventory holding to stay on an average of 15% of inventories, mainly reflecting our view on rising cattle prices.

11.1.12.4 Management fee

Cresud pays a fee equal to 10% of net income for agricultural advisory services and other management services.

11.1.12.5 Income from related companies

This income consists almost entirely of owning interest in IRSA. Since we have valued this company, we use the projected cash flows from the IRSA valuation.

11.1.12.6 Taxes Payable / Revenues

We expect the taxes payable / revenues ratio to stabilize at the corporate tax level of 35 %.

11.2 Valuation⁹⁸

1996 - Today	CAPM		Downside Beta				Downside Beta and added country risk			
	World		Local		World		Local		World	
	β_{World}	β_{Local}	β_U	β_0	β_U	β_0	β_U	β_0	β_U	β_0
CE:	8,1 %	13,5 %	10,9 %	11,1 %	14,4 %	14,4 %	14,4 %	14,5 %	14,6 %	
WACC	8,0 %	12,6 %	10,3 %	10,5 %	13,3 %	13,3 %	13,3 %	13,4 %	13,5 %	
Share value:	11,9	3,8	6,2	6,0	3,3	3,3	3,3	3,2	3,1	

1996 - Today	Sovereign Yield Spread	Weighted value sales domestic:	Equally weighted value:
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	β_{World}		
CE:		11,7 %	10,8 %
WACC		11,0 %	10,3 %
Share value:		5,3	6,3

July 2002 - Today	CAPM		Downside Beta				Downside Beta and added country risk			
	World		Local		World		Local		World	
	β_{World}	β_{Local}	β_U	β_0	β_U	β_0	β_U	β_0	β_U	β_0
CE:	9,1 %	14,1 %	12,5 %	12,3 %	15,9 %	16,4 %	16,4 %	16,1 %	15,8 %	
WACC	8,8 %	13,0 %	11,7 %	11,5 %	14,6 %	15,0 %	15,0 %	14,7 %	14,5 %	
Share value:	9,2	3,5	4,5	4,8	2,5	2,3	2,3	2,4	2,6	

July 2002 - Today	Sovereign Yield Spread	Weighted value sales domestic:	Equally weighted value:
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	β_{World}		
CE:		12,7 %	11,6 %
WACC		11,9 %	10,9 %
Share value:		4,4	5,4

From our valuation in excel, we obtain a range of share values, spanning from 2,3 to 11,9. Looking at the last quoted share value, 4,45, we conclude that our results are in accordance with the market. Again, the world CAPM gives the most far-off value, causing us to discard it from further analyses. We observe no significant differences in the results from the costs of capital assuming different levels of market integration.

Both of the weighted costs of capital provide results with good fit to observed stock values. This does not come as a surprise since sales are divided 50-50 between exports and domestic sales, causing the different costs of capital to provide similar values.

⁹⁸ For the beta estimations, cost of equity calculations and valuations see Appendix Cresud. The complete results can be found in the Appendix Cresud found as an appendix to this paper, while the calculations and results are attached electronically on a CD.

The 2002-today time-series seems to yield share prices closer to observed share values than the costs of equity using the time series from 1996-today.

12 MetroGAS

12.1 Company outlook MetroGAS

12.1.1 Company profile

MetroGAS S.A., Argentina's largest gas distribution company, started operations in 1992 when the privatization of Gas del Estado was completed. The company has more than 1.9 million customers in a service territory that covers 2159 km², making it the biggest player in the Argentine market with a 24% market share. MetroGAS has been granted an exclusive licence to distribute natural gas in the Buenos Aires area. Natural gas consumption has tripled over the last 25 years, and now has a 46% share of total primary energy consumed. In 2004, sales of natural gas to residential customers accounted for 47% of sales, while sales of gas and transportation and distribution services to industrial and commercial customers and governmental entities accounted for approximately 20% of sales. The rest of sales were to power plants and suppliers of, and dealers in, CNG, used as vehicle fuel. The company is currently trying to work itself out of a financial crisis due to the energy crisis in 2004, a natural gas supply shortage. Argentina's energy demands grew quickly as industry recovered after the economic crisis in 2001, but extraction and transportation of natural gas, a cheap and relatively abundant fossil fuel, did not match the surge.⁹⁹

12.1.2 Company risk

12.1.2.1 Foreign exchange risk

While all the company earnings are in Pesos, a substantial amount of the corporate debt is US Dollar-denominated. In 2002, the Public Emergency Law floated and devalued the Peso. This resulted in a tripling of MetroGAS' foreign currency denominated financial debt. Also, further devaluation of the Peso will have a dramatic effect on the company's financial condition as the book value of the largely foreign currency-denominated debt increases more than the Peso-denominated book value of assets.

⁹⁹ <http://en.wikipedia.org/wiki/Argentine_energy_crisis_%282004%29> [Internet] [Downloaded 26.07.06]

12.1.2.2 Inflation

In 2002, the Public Emergency Law stopped all tariff adjustments. None of the Peso revenues are subject to inflation adjustments. Unless tariffs increase with at least the same rate as the inflation rate, real revenues will decrease with inflation.

12.1.2.3 GDP growth

All operations and customers are located in Argentina, something that makes the company vulnerable to the general economic climate in the country. A dramatic reduction in the economic growth will deteriorate the customers' ability to pay their bills.

12.1.2.4 Weather

Demand for the company's services is highly sensitive to weather conditions in Argentina. Residential demand depends on temperature, with winter being the peak season. Irregularly warm weather in the winter months will cause residential revenues to drop, imposing material adverse effects on operations.

12.1.2.5 Governmental regulations

ENARGAS, the agency of the Argentine government, regulates the industry. ENARGAS can revoke MetroGAS' exclusive licence for a number of reasons, and they are also in charge of tariff negotiations. The Public Emergency Law froze tariffs but also opened for renegotiations. The company is currently renegotiating tariffs with the authorities. The results may have material negative consequences for operations. This matter is so important to MetroGAS, that their short-term strategy has been aimed at working with the Argentine government in order to speed up decisions and reach agreements on tariff increases that ensure continuity of operations and coverage for debt repayment.

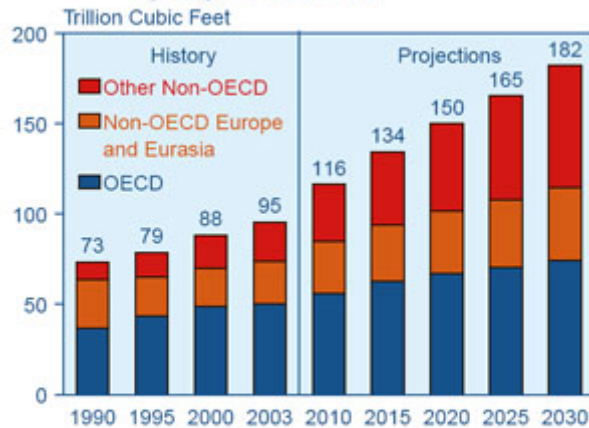
12.1.2.6 Substitutes

Revenues will be adversely affected by increased supply of cheaper energy like hydroelectric power, or reduced prices on readily available products like fuel oil. MetroGAS competes directly with fuel oil for sales to dual-fuel power plants.

12.1.3 Supply & Demand

Due to the increase in demand for natural gas and shortages in both supply and transportation capacity, we may be unable to supply all gas demanded by our customers on certain days during the year. World natural gas reserves and world demand for natural gas have each increased significantly in recent years. Natural gas is the only fossil fuel to have experienced reserve estimate increases in nearly every region of the world over the past decade. In 2003, Argentina's estimated natural gas reserve life was no more than 12 years. This doesn't constitute a major problem since proven reserves can increase substantially in the future, as gas companies have only explored five of 19 basins in the country.

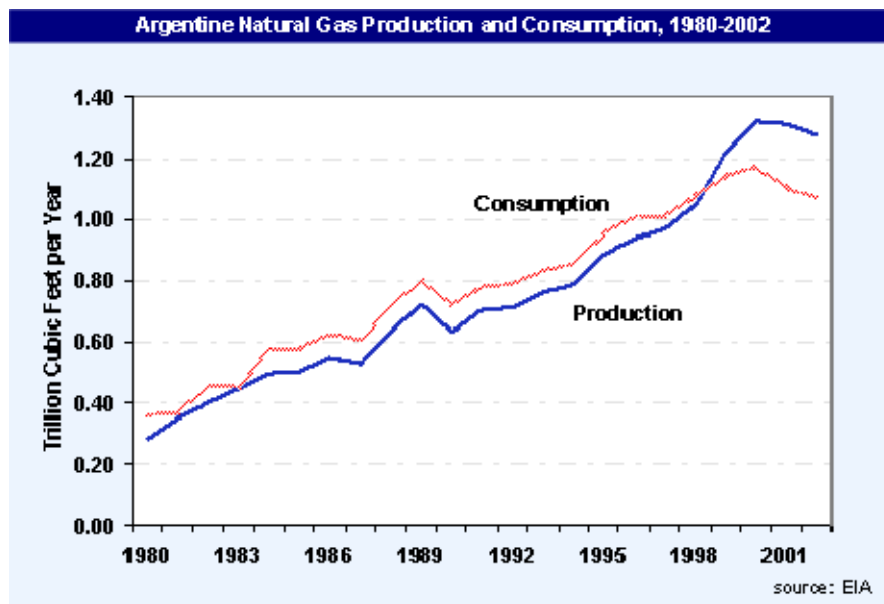
Figure 34. World Natural Gas Consumption by Region, 1990-2030



Sources: **History:** Energy Information Administration (EIA), *International Energy Annual 2003* (May-July 2005), web site www.eia.doe.gov/iea/. **Projections:** EIA, *System for the Analysis of Global Energy Markets* (2006).

In 2004 the government introduced caps on natural gas prices. This has led to increased gas demand, outstripping supply. The result was a country energy crisis, leading the government to promise to raise natural gas prices in the future. The industry will probably face an increasing demand in the future: In Central and South America, natural gas is the

fastest growing fuel source, with demand increasing on average by 3.9 percent per year, from 3.8 trillion cubic feet in 2003 to 10.8 trillion cubic feet in 2030.¹⁰⁰



12.1.4 Conclusion

We expect to see demand increase at an annual rate of four percent, although somewhat more over the next two years due to continued strong economic expansion. We expect prices to increase next year as a result of the ongoing tariff negotiations. In the macroeconomic outlook we have argued that inflation will be high in the years to come, and that the Peso will appreciate. We think the company will be able to raise prices, at least enough to eliminate the effects of inflation on real revenues. Revenue growth should be strong over the next five years. From 2009, prices should be liberalized, while continued demand growth should facilitate a 20% revenue growth for another five years. We forecast long term sustainable growth to 5 %, reflecting a positive view on natural gas as the energy source after oil.

Growth forecasts, Metrogas						
	2006	2007	2008	2009	2010	2011
Growth, volume	50%	40%	30%	20%	20%	10%
Growth, price	0%	25%	0%	15%	15%	10%

¹⁰⁰Energy Information Administration, www.eia.doe.gov [Internet] [Downloaded 15.05.06]

Inflation	15%	10%	10%	10%	8%	5%
Revenue	72,5%	92,5%	43,0%	51,8%	49,0%	27,1%

From 2012 we apply a sustainable growth of five percent, reflecting our views on lower levels of inflation and an expanding market.

12.1.4.1 Operating income

Revenues grow accordingly to our volume and price forecasts from the company outlook. Operating costs are divided up and linked to revenues. We think transportation costs will decline over time, caused by an increased use of pipelines in stead of trucks.

12.1.4.2 Accounts receivable

As Argentina recovers from the 2002 crisis, we expect too see an increased willingness and ability for people to pay their gas bills.

12.1.4.3 Fixed assets/revenues

Because substantial parts of revenues are forecasted to come from price increases, fixed assets don't have to grow at the same rates as sales. Therefore, we forecast the fixed assets/revenues-ratio to decline over time.

12.2 Valuation¹⁰¹

1996 - Today	CAPM		Downside Beta				Downside Beta and added country risk			
	World	Local	World		Local		World			
	β_{World}	β_{Local}	β_{μ}	β_0	β_{μ}	β_0	β_{μ}	β_0	β_{μ}	β_0
CE:	8,7 %	14,2 %	12,0 %	12,4 %	15,0 %	15,1 %	15,6 %	16,0 %		
WACC	5,7 %	7,3 %	6,7 %	6,8 %	7,5 %	7,6 %	7,7 %	7,8 %		
Share value:	2,6	0,8	1,1	1,0	0,7	0,7	0,6	0,6		

1996 - Today	Sovereign Yield Spread	Weighted value sales domestic:	Equally weighted value:
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	β_{World}		
CE:		12,3 %	14,2 %
WACC		6,8 %	7,3 %
Share value:		1,0	0,8

July 2002 - Today	CAPM		Downside Beta				Downside Beta and added country risk			
	World	Local	World		Local		World			
	β_{World}	β_{Local}	β_{μ}	β_0	β_{μ}	β_0	β_{μ}	β_0	β_{μ}	β_0
CE:	10,5 %	15,2 %	14,6 %	14,4 %	16,6 %	16,9 %	18,2 %	18,0 %		
WACC	6,3 %	7,6 %	7,4 %	7,4 %	8,0 %	8,1 %	8,4 %	8,4 %		
Share value:	1,5	0,7	0,7	0,8	0,6	0,6	0,5	0,5		

July 2002 - Today	Sovereign Yield Spread	Weighted value sales domestic:	Equally weighted value:
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	β_{World}		
CE:		14,1 %	15,2 %
WACC		7,3 %	7,6 %
Share value:		0,8	0,7

From our valuation in excel, we obtain a range of share values, spanning from 0,5 to 2,6. Looking at the last quoted share value, 1,02, we conclude that our results are in accordance with the market. Again, we think the world CAPM produces a too low WACC, and should be discarded from further analyses. In general, our values are a bit lower than observed market values. This is probably due to our forecasts being more pessimistic than the market's expectations for the company.

¹⁰¹ For the beta estimations, cost of equity calculations and valuations see Appendix MetroGAS. The complete results can be found in the Appendix MetroGAS found as an appendix to this paper, while the calculations and results are attached electronically on a CD.

The equally weighted equity and the weighted cost of equity return similar results, both slightly lower than observed market values (in accordance with our forecasts). The costs of equity using the time series from 1996-today consistently yielded share prices somewhat closer to observed share values than the 2002-today time-series.

13 Conclusion

We have conducted valuations on four Argentine companies, using a discounted cash flow-approach. The weighted average cost of capital (WACC) has been used to discount the cash-flows. The WACCs have been calculated using different costs of equity, taking on various assumptions on level of market integration. The two extremes are the world CAPM (which assumes fully integrated capital markets) and the local CAPM (assumes fully segmented markets). We have used a range of ways to calculate costs of equity which take on positions ranging from a view of full integration to full segmentation. We conclude that the world CAPM generally yields too high returns compared to the observed market values, while the local CAPM generally yields too low values. We conclude that these findings indicate the need for costs of equity taking into account the different levels of market integration.

Looking at our beta estimations, we find that R^2 is higher on the “local” beta estimations, than on the “world” beta estimations. We consider this as a sign that our companies tend to trail the local market more closely than the world market. Looking at our results, we find a connection between the results from our weighted cost of Equity (applying weights reflecting the companies’ exports versus domestic sales), and observed market share values.

As most emerging markets are neither fully integrated with the world economy, nor fully segmented, we find it purposeful to apply the weighted cost of capital when performing valuations on the Argentine market. While textbook literature (Koller, Goedhart and Wessels, 2005) suggests including both scenario approaches and multiples when valuing companies in emerging markets, we argue that this may be too time-consuming and costly compared to the improved quality of the results. This view is based upon the high volatility in these markets, combined with the lack of information.

Looking at the results from our two time-period calculations, we do not find significant differences sufficient to conclude on which leads to the best results. For a simple

comparison of our main results, we therefore choose the 2002-today period results. This time series is the most appealing series, considering the Argentine Economic crisis during 2001.

	IRSA	Siderar	Cresud	MetroGAS
Share Value (Buenos Aires, 26.07.06)	3,35	23,85	4,45	1,02
World CAPM	9,5	53,6	9,2	1,5
Weighted Domestic Sales	4,8	26,1	5,4	0,7

As we see, our WACC based on our weighted cost of equity (domestic sales as share of total sales) yields us the most appealing results.

We conclude that since the Argentine market is neither fully integrated with the World economy, nor fully segmented, the correct cost of equity must consider this. We argue that using our weighted cost of capital, which uses exports versus domestic sales as a proxy for a company's integration with the World market, is simple, intuitive and provides consistent results.

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15 Appendix

- Appendix IRSA, Cost of Equity (3 pages)
- Appendix IRSA, Valuation (3 pages)
- Appendix Siderar, Cost of Equity (3 pages)
- Appendix Siderar, Valuation (3 pages)
- Appendix Cresud, Cost of Equity (3 pages)
- Appendix Cresud, Valuation (3 pages)
- Appendix MetroGAS, Cost of Equity (3 pages)
- Appendix MetroGAS, Valuation (3 pages)
- Appendix Currency Forecast

Attached electronically:

- Three electronic .xls-files pr company:
 - Company name, Average Return and Beta.xls
 - Company name, Cost of Equity.xls
 - Company name, Valuation.xls



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Appendix IRSA Cost of Equity

Global:

R_f
($R_m - R_f$)

0,052 10 year TNX, 26.06.06

0,055 (Koller, Goedhart and Wessels, 2005)

Local:

R_f
($R_m - R_f$) (USD)

0,088 10 year TNX + EMBI+ Argentina, 14.06.06

0,089 Sovereign Bond Premium * Relative St. Dev (Merval/MSCI)

Spread:

JP Morgang EMBI+ Argentina Spread

0,0359 (Cbonds.info, 14.06.06)

Estimation of β , 1996 - today = LH (Long History)

Estimation of β 02.01.96 - today

Exchange rate used in estimates:

Estimate: 5 - 549

Standard Error:

Adjusted R^2 Systematic risk:

(1- Adjusted R^2) Unsystematic risk:

CAPM: Downside β :

	β_{World} USD	β_{Local} USD	World β_{μ} USD	β_0 USD	Local β_{μ} USD	β_0 USD
	1,04	1,04	0,66	1,39	1,45	0,80
Standard Error:	0,1081	0,1081	0,0379	0,0966	0,1013	0,0325
Adjusted R^2 Systematic risk:	0,143	0,143	0,360	0,274	0,271	0,528
(1- Adjusted R^2) Unsystematic risk:	0,857	0,857	0,640	0,726	0,729	0,472
Ce:	10,9 %	10,9 %	14,7 %	12,8 %	13,2 %	15,9 %

The Estrada Model added a Country Risk

Premium:

Sovereign Yield Spread Model

16,4 %

16,8 %

Estimation of β , after financial crisis (stabilization July-2002) = SH (Short history)

Estimation of β from July 2002 - today

Exchange rate used in estimates:

Estimate: 5-211

Standard Error:

Adjusted R^2 Systematic risk:

(1- Adjusted R^2) Unsystematic risk:

CAPM: Downside β :

	β_{World} USD	β_{Local} USD	World β_{μ} USD	β_0 USD	Local β_{μ} USD	β_0 USD
	0,98	0,98	0,54	1,21	1,12	0,74
Standard Error:	0,1667	0,1667	0,0753	0,1397	0,1376	0,0584
Adjusted R^2 Systematic risk:	0,139	0,139	0,198	0,264	0,239	0,435
(1- Adjusted R^2) Unsystematic risk:	0,861	0,861	0,802	0,736	0,761	0,565
Ce:	10,6 %	10,6 %	13,6 %	11,9 %	11,4 %	15,4 %

The Estrada Model added a Country Risk

Premium:

Sovereign Yield Spread Model

15,5 %

15,0 %

	MSCI AC WORLD - Price index (USD)	Merval - Price index (USD)	IRSA, Price Index (USD)
Volatility:			
Deviation			
Annual St.Dev (Total risk):	0,0593	0,1462	0,1615
Relative St.Dev (Relative to MSCI World)		2,4660	2,7230
Deviation (July 2002 - Today)			
Annual St.Dev (Total risk):	0,0597	0,1277	0,1540
Relative St.Dev (Relative to MSCI World)		2,1529	2,5972
Semi Deviation			
Annual Semi Deviation (Ri;y;0)	0,0445	0,1066	0,1179
Annual Semi Deviation (Ri;0)	0,0432	0,1068	0,1197
Semi Deviation (July 2002 - Today)			
Annual Semi Deviation (Ri;y;0)	0,0443	0,0928	0,1038
Annual Semi Deviation (Ri;0)	0,0427	0,0816	0,0970

Appendix IRSA Valuation

Last reported share value (yahoo finance, 26.07.06)	3,350
Corporation Tax	35 %
Cost of Debt	11 %
Debt/debt+equity	29,6 %
NO of shares AR	423600
Share of sales in domestic market:	100 %

Period: 1996 - Today

	CAPM		Downside Beta	
	World	Local	World	Local
	β_{World}	β_{Local}	β_u	β_o
CE:	10,9 %	14,7 %	12,8 %	15,9 %
WACC	9,8 %	12,4 %	11,2 %	13,3 %
DCF	-344,5	-332,0	-337,9	-328,0
Terminal Value	1785,6	1061,8	1339,7	1283,9
DCF + Terminal Value ARS	4409,8	2233,3	3065,3	2897,8
Excess Cash	204,5	204,5	204,5	204,5
Long-term Debt	468,8	468,8	468,8	468,8
Company Value	3736,5	1560,0	2392,0	1129,8
Share value	8,8	3,7	5,6	2,7
				2,6

Period: July 2002 - Today

	CAPM		Downside Beta	
	World	Local	World	Local
	β_{World}	β_{Local}	β_u	β_o
CE:	10,6 %	13,6 %	11,9 %	15,4 %
WACC	9,6 %	11,7 %	10,5 %	12,9 %
DCF	-345,6	-335,5	-341,2	-329,8
Terminal Value	1883,0	1214,3	1536,9	1659,9
DCF + Terminal Value ARS	4704,4	2689,2	3658,8	4029,9
Excess Cash	204,5	204,5	204,5	204,5
Long-term Debt	468,8	468,8	468,8	468,8
Company Value	4031,0	2015,8	2985,4	3356,6
Share value	9,5	4,8	7,0	3,1
				2,9

1996 - Today		World		β_{World}	
Period:	Downside Beta and added country risk premium	Sovereign Yield Spread	Weighted value sales domestic:	Equally weighted value:	
CE:	16,4 %	16,8 %	14,5 %	14,7 %	14,6 %
WACC	13,7 %	13,9 %	12,3 %	12,4 %	12,4 %
DCF	-326,3	-325,3	-332,6	-332,0	-332,2
Terminal Value	865,4	836,1	1084,4	1061,8	1071,7
DCF + Terminal Value ARS	1649,5	1563,0	2300,7	2233,3	2262,8
Excess Cash	204,5	204,5	204,5	204,5	204,5
Long-term Debt	468,8	468,8	468,8	468,8	468,8
Company Value	976,1	889,6	1627,4	1560,0	1589,5
Share value	2,3	2,1	3,8	3,7	3,8

July 2002 - Today		World		β_{World}	
Period:	Downside Beta and added country risk premium	Sovereign Yield Spread	Weighted value sales domestic:	Equally weighted value:	
CE:	15,5 %	15,0 %	14,2 %	13,6 %	13,7 %
WACC	13,0 %	12,6 %	12,1 %	11,7 %	11,7 %
DCF	-329,4	-331,0	-333,6	-335,5	-335,3
Terminal Value	965,3	1025,2	1129,0	1214,3	1204,0
Excess Cash	1946,0	2124,0	2434,0	2689,2	2658,3
Long-term Debt	204,5	204,5	204,5	204,5	204,5
Company Value	1272,6	1450,7	1760,7	2015,8	1984,9
Share value	3,0	3,4	4,2	4,8	4,7

Appendix Siderar Cost of Equity

Global:

R_f
($R_m - R_f$)

0,052 10 year TNX, 26.06.06

0,055 Valuation, Measuring and managing the value of companies

Local:

R_f
($R_m - R_f$) (USD)

0,088 10 year TNX + EMBI+ Argentina, 14.06.06

0,089 Sovereign Bond Premium * Relative St. Dev (Merval/MSCI)

Spread:

JP Morgang EMBI+ Argentina Spread

0,0359 (Cbonds.info, 14.06.06)

Estimation of β , 1996 - today = LH (Long History)

Estimation of β 02.01.96 - today

Exchange rate used in estimates:

Estimate: 5 - 549

Standard Error:

Adjusted R^2 Systematic risk:

(1- Adjusted R^2) Unsystematic risk:

CAPM:

Downside β :

β_{World} USD	β_{Local} USD	World β_{μ} USD	β_0 USD	Local β_{μ} USD	β_0 USD
0,76	0,0479	0,90	1,42	1,42	0,99
0,1486	0,400	0,0479	0,1288	0,1312	0,0415
0,045	0,600	0,400	0,187	0,180	0,518
0,955		0,600	0,813	0,820	0,482
9,4 %	16,7 %	13,0 %	13,0 %	13,0 %	17,5 %

Ce:

The Estrada Model added a Country Risk

Premium:

Sovereign Yield Spread Model

16,6 %

13,0 %

Estimation of β , after financial crisis (stabilization July-2002) = SH (Short history)

Estimation of β from July 2002 - today

Exchange rate used in estimates:

Estimate: 5-211

Standard Error:

Adjusted R^2 Systematic risk:

(1- Adjusted R^2) Unsystematic risk:

CAPM:

Downside β :

β_{World} USD	β_{Local} USD	World β_{μ} USD	β_0 USD	Local β_{μ} USD	β_0 USD
0,29	0,0713	0,78	1,01	0,86	0,95
0,1907	0,366	0,0713	0,1591	0,1429	0,0504
0,007	0,634	0,366	0,159	0,144	0,627
0,993		0,634	0,841	0,856	0,373
6,8 %	15,7 %	10,8 %	10,8 %	9,9 %	17,2 %

Ce:

The Estrada Model added a Country Risk

Premium:

Sovereign Yield Spread Model

14,3 %

10,4 %

	MSCI AC WORLD - Price index (USD)	Merval - Price index (USD)	Siderar, Price Index (USD)
Volatility:			
Deviation			
Annual St.Dev (Total risk):	0,0593	0,1462	0,2091
Relative St.Dev (Relative to MSCI World)		2,4660	3,5266
Deviation (July 2002 - Today)			
Annual St.Dev (Total risk):	0,0597	0,1277	0,1640
Relative St.Dev (Relative to MSCI World)		2,1529	2,7658
Semi Deviation			
Annual Semi Deviation (Ri-y;0)	0,0445	0,1066	0,1478
Annual Semi Deviation (Ri;0)	0,0432	0,1068	0,1454
Semi Deviation (July 2002 - Today)			
Annual Semi Deviation (Ri-y;0)	0,0443	0,0928	0,1106
Annual Semi Deviation (Ri;0)	0,0427	0,0816	0,0949

Appendix Siderar Valuation

Last reported share value (yahoo finance, 26.07.06)	23,85
Marginal tax rate	35 %
Cost of Debt	9 %
Debt structure	24,2 %
No of shares	347468,771
Share of sales in domestic market:	30 %

Period: 1996 - Today

	CAPM				Downside Beta			
	World β_{World}	Local β_{Local}	World β_u	Local β_u	World β_o	Local β_u	World β_o	Local β_u
CE:	9,4 %	16,7 %	13,0 %	13,0 %	17,5 %	17,3 %	17,3 %	17,3 %
WACC	8,5 %	14,1 %	11,3 %	11,3 %	14,7 %	14,6 %	14,6 %	14,6 %
DCF	289901,0	230935,4	258609,2	258889,9	225365,2	226644,6	225365,2	226644,6
Terminal Value	3178497,6	1051798,4	1691882,8	1700528,4	960193,5	980414,5	960193,5	980414,5
DCF + Terminal Value ARS	10613299,6	3925165,3	5968505,3	5995819,9	3627809,5	3693601,0	3627809,5	3693601,0
Excess Cash	390990,0	390990,0	390990,0	390990,0	390990,0	390990,0	390990,0	390990,0
Long-term Debt	922900,0	922900,0	922900,0	922900,0	922900,0	922900,0	922900,0	922900,0
Company Value	9299409,6	2611275,3	4654615,3	4681929,9	2313919,5	2379711,0	2313919,5	2379711,0
Share value	26,8	7,5	13,4	13,5	6,7	6,8	6,7	6,8

Period: July 2002 - Today

	CAPM				Downside Beta			
	World β_{World}	Local β_{Local}	World β_u	Local β_u	World β_o	Local β_u	World β_o	Local β_u
CE:	6,8 %	15,7 %	10,8 %	9,9 %	17,2 %	16,8 %	16,8 %	16,8 %
WACC	6,6 %	13,3 %	9,6 %	8,9 %	14,4 %	14,2 %	14,4 %	14,2 %
DCF	314415,7	238217,4	277446,2	284957,1	227727,0	230307,4	227727,0	230307,4
Terminal Value	6197875,5	1186967,2	2428486,4	2845737,8	997893,0	1040993,8	997893,0	1040993,8
DCF + Terminal Value ARS	19927611,0	4361064,8	8280153,8	9579926,5	3750397,2	3890181,7	3750397,2	3890181,7
Excess Cash	390990,0	390990,0	390990,0	390990,0	390990,0	390990,0	390990,0	390990,0
Long-term Debt	922900,0	922900,0	922900,0	922900,0	922900,0	922900,0	922900,0	922900,0
Company Value	18613721,0	3047174,8	6966263,8	8266036,5	2436507,2	2576291,7	2436507,2	2576291,7
Share value	53,6	8,8	20,0	23,8	7,0	7,4	7,0	7,4

Period: 1996 - Today		Downside Beta and added country risk premium		Sovereign Yield Spread		Weighted value sales domestic:		Weighted value:	
World		β_{World}		β_{World}					
β_u	β_o								
CE:	16,6 %	16,6 %	13,0 %	11,6 %	14,5 %				
WACC	14,0 %	14,0 %	11,2 %	10,2 %	12,4 %				
DCF	231719,3	231965,8	259153,3	270507,8	247350,0				
Terminal Value	1065464,9	1069805,5	1708692,8	2114872,2	1386418,1				
DCF + Terminal Value ARS	3969383,5	3983420,2	6021609,2	7299262,6	4999330,4				
Excess Cash	390990,0	390990,0	390990,0	390990,0	390990,0				
Long-term Debt	922900,0	922900,0	922900,0	922900,0	922900,0				
Company Value	2655493,5	2669530,2	4707719,2	5985372,6	3685440,4				
Share value	7,6	7,7	13,5	17,2	10,6				

Period: July 2002 - Today		Downside Beta and added country risk premium		Sovereign Yield Spread		Weighted value sales domestic:		Weighted value:	
World		β_{World}		β_{World}					
β_u	β_o								
CE:	14,3 %	13,5 %	10,4 %	9,5 %	12,5 %				
WACC	12,3 %	11,6 %	9,3 %	8,6 %	10,9 %				
DCF	248245,8	254825,5	280579,4	288849,9	262886,9				
Terminal Value	1408076,8	1580622,7	2591308,7	3103179,0	1830013,9				
DCF + Terminal Value ARS	5068347,2	5616471,2	8787977,7	10379608,4	6404276,6				
Excess Cash	390990,0	390990,0	390990,0	390990,0	390990,0				
Long-term Debt	922900,0	922900,0	922900,0	922900,0	922900,0				
Company Value	3754457,2	4302581,2	7474087,7	9065718,4	5090386,6				
Share value	10,8	12,4	21,5	26,1	14,6				

Appendix Cresud Cost of Equity

Global:

R_f
($R_m - R_f$)

0,052 10 year TNX, 26.06.06

0,055 Valuation, Measuring and managing the value of companies

Local:

R_f
($R_m - R_f$) (USD)

0,088 10 year TNX + EMBI+ Argentina, 14.06.06

0,089 Sovereign Bond Premium * Relative St. Dev (Merval/MSCI)

Spread:

JP Morgang EMBI+ Argentina Spread

0,0359 (Cbonds.info, 14.06.06)

Estimation of β , 1996 - today = LH (Long History)

Estimation of β 02.01.96 - today

Exchange rate used in estimates:

Estimate: 5 - 549

Standard Error:

Adjusted R^2 Systematic risk:

(1- Adjusted R^2) Unsystematic risk:

Ce: **8,1 %** **13,5 %** **10,9 %** **11,1 %** **14,4 %** **14,4 %**

The Estrada Model added a Country Risk

Premium:

11,7 %

Sovereign Yield Spread Model

CAPM: Downside β :

	β_{World} USD	β_{Local} USD	World β_{μ} USD	β_0 USD	Local β_{μ} USD	β_0 USD
	0,53	0,54	0,0447	1,04	1,06	0,63
Standard Error:	0,1219	0,0447	0,1010	0,1010	0,1048	0,0373
Adjusted R^2 Systematic risk:	0,033	0,214	0,161	0,161	0,158	0,344
(1- Adjusted R^2) Unsystematic risk:	0,967	0,786	0,839	0,839	0,842	0,656
Ce:	8,1 %	13,5 %	10,9 %	11,1 %	11,1 %	14,4 %

14,5 %

14,6 %

Estimation of β , after financial crisis (stabilization July-2002) = SH (Short history)

Estimation of β from July 2002 - today

Exchange rate used in estimates:

Estimate: 5-211

Standard Error:

Adjusted R^2 Systematic risk:

(1- Adjusted R^2) Unsystematic risk:

Ce: **9,1 %** **14,1 %** **12,5 %** **12,3 %** **15,9 %** **16,4 %**

The Estrada Model added a Country Risk

Premium:

12,7 %

Sovereign Yield Spread Model

CAPM: Downside β :

	β_{World} USD	β_{Local} USD	World β_{μ} USD	β_0 USD	Local β_{μ} USD	β_0 USD
	0,71	0,59	0,0892	1,33	1,28	0,80
Standard Error:	0,2043	0,0892	0,1831	0,1831	0,1839	0,0804
Adjusted R^2 Systematic risk:	0,051	0,174	0,199	0,199	0,186	0,322
(1- Adjusted R^2) Unsystematic risk:	0,949	0,826	0,801	0,801	0,814	0,678
Ce:	9,1 %	14,1 %	12,5 %	12,3 %	12,3 %	15,9 %

16,1 %

15,8 %

	MSCI AC WORLD - Price index (USD)	Merval - Price index (USD)	Siderar, Price Index (USD)
Volatility:			
Deviation			
Annual St.Dev (Total risk):	0,0593	0,1462	0,1687
Relative St.Dev (Relative to MSCI World)		2,4660	2,8450
Deviation (July 2002 - Today)			
Annual St.Dev (Total risk):	0,0597	0,1277	0,1798
Relative St.Dev (Relative to MSCI World)		2,1372	3,0103
Semi Deviation			
Annual Semi Deviation (R _{t-y;0})	0,0445	0,1066	0,1146
Annual Semi Deviation (R _{t;0})	0,0432	0,1068	0,1151
Semi Deviation (July 2002 - Today)			
Annual Semi Deviation (R _{t-y;0})	0,0443	0,0928	0,1304
Annual Semi Deviation (R _{t;0})	0,0427	0,0816	0,1253

Appendix Cresud Valuation

Last reported share value (yahoo finance, 26.07.06)	4,450
Corporation Tax	0,35
Cost of Debt	0,11
Debt/debt+equity	0,151
NO of shares	160031,351
Share of sales in domestic market:	50 %

Period: 1996 - Today

	Downside Beta					
	CAPM		World		Local	
	β_{World}	β_{Local}	β_{μ}	β_0	β_{μ}	β_0
CE:	8,1 %	13,5 %	10,9 %	11,1 %	14,4 %	14,4 %
WACC	8,0 %	12,6 %	10,3 %	10,5 %	13,3 %	13,3 %
DCF	28153,8	24097,8	25939,5	25830,4	23537,1	23525,5
Terminal Value	653531,4	235382,5	358585,5	349263,7	208605,3	208090,8
DCF + Terminal Value ARS	2085956,7	794009,6	1176646,8	1147788,0	710355,9	708745,9
Excess Cash	72882,8	72882,8	72882,8	72882,8	72882,8	72882,8
Long-term Debt	115693,6	115693,6	115693,6	115693,6	115693,6	115693,6
Company Value	1897380,4	605433,3	988070,5	959211,7	521779,6	520169,6
Share value	11,9	3,8	6,2	6,0	3,3	3,3

Period: July 2002 - Today

	Downside Beta					
	CAPM		World		Local	
	β_{World}	β_{Local}	β_{μ}	β_0	β_{μ}	β_0
CE:	9,1 %	14,1 %	12,5 %	12,3 %	15,9 %	16,4 %
WACC	8,8 %	13,0 %	11,7 %	11,5 %	14,6 %	15,0 %
DCF	27327,0	23754,0	24790,0	24967,1	22599,5	22316,5
Terminal Value	513026,4	218517,3	274325,5	285530,3	171250,9	161483,5
DCF + Terminal Value ARS	1653481,6	741350,0	915293,4	950122,0	593182,3	562427,9
Excess Cash	72882,8	72882,8	72882,8	72882,8	72882,8	72882,8
Long-term Debt	115693,6	115693,6	115693,6	115693,6	115693,6	115693,6
Company Value	1464905,3	552773,7	726717,1	761545,7	404606,0	373851,6
Share value	9,2	3,5	4,5	4,8	2,5	2,3

Period: 1996 - Today		Downside Beta and added country risk premium		Sovereign Yield Spread		Weighted value sales domestic:		Equally weighted value:	
World		β_{World}							
β_U	β_0								
CE:	14,5 %	14,6 %	11,7 %	10,8 %	12,4 %				
WACC	13,4 %	13,5 %	11,0 %	10,3 %	11,6 %				
DCF	23468,8	23375,4	25360,2	26004,8	24861,0				
Terminal Value	205592,1	201550,8	312531,7	364315,5	278755,0				
DCF + Terminal Value ARS	700926,6	688274,3	1033949,3	1194380,0	929065,2				
Excess Cash	72882,8	72882,8	72882,8	72882,8	72882,8				
Long-term Debt	115693,6	115693,6	115693,6	115693,6	115693,6				
Company Value	512350,2	499698,0	845373,0	1005803,7	740488,9				
Share value	3,2	3,1	5,3	6,3	4,6				

Period: July 2002 - Today		Downside Beta and added country risk premium		Sovereign Yield Spread		Weighted value sales domestic:		Equally weighted value:	
World		β_{World}							
β_U	β_0								
CE:	16,1 %	15,8 %	12,7 %	11,6 %	13,6 %				
WACC	14,7 %	14,5 %	11,9 %	10,9 %	12,7 %				
DCF	22483,8	22635,7	24654,9	25444,0	24021,4				
Terminal Value	167181,9	172545,2	266144,0	318698,5	231505,4				
DCF + Terminal Value ARS	580377,1	597253,7	889844,6	1053076,3	781911,9				
Excess Cash	72882,8	72882,8	72882,8	72882,8	72882,8				
Long-term Debt	115693,6	115693,6	115693,6	115693,6	115693,6				
Company Value	391800,8	408677,4	701268,3	864499,9	593335,6				
Share value	2,4	2,6	4,4	5,4	3,7				

Appendix MetroGAS Cost of Equity

Global:

R_f
($R_m - R_f$)

0,052 10 year TNX, 26.06.06

0,055 Valuation, Measuring and managing the value of companies

Local:

R_f
($R_m - R_f$) (USD)

0,088 10 year TNX + EMBI+ Argentina, 14.06.06

0,089 Sovereign Bond Premium * Relative St. Dev (Merval/MSCI)

Spread:

JP Morgang EMBI+ Argentina Spread

0,0359 (Cbonds.info, 14.06.06)

Estimation of β , 1996 - today = LH (Long History)

Estimation of β 02.01.96 - today

Exchange rate used in estimates:

Estimate: 5 - 549

Standard Error:

Adjusted R^2 Systematic risk:

(1- Adjusted R^2) Unsystematic risk:

Ce: **8,7 %** **14,2 %** **12,0 %** **12,4 %** **15,0 %** **15,1 %**

The Estrada Model added a Country Risk

Premium:

15,6 %

16,0 %

Sovereign Yield Spread Model

CAPM:

β_{World} USD	β_{Local} USD	World β_{μ} USD	β_0 USD	Local β_{μ} USD	β_0 USD
0,63	0,61	0,1037	1,24	1,31	0,70
0,1250	0,0449	0,207	0,1037	0,1092	0,0385
0,043	0,250	0,793	0,207	0,207	0,374
0,957	0,750	0,793	0,793	0,793	0,626

Estimation of β , after financial crisis (stabilization July-2002) = SH (Short history)

Estimation of β from July 2002 - today

Exchange rate used in estimates:

Estimate: 5-211

Standard Error:

Adjusted R^2 Systematic risk:

(1- Adjusted R^2) Unsystematic risk:

Ce: **10,5 %** **15,2 %** **14,6 %** **14,4 %** **16,6 %** **16,9 %**

The Estrada Model added a Country Risk

Premium:

18,2 %

18,0 %

Sovereign Yield Spread Model

CAPM:

β_{World} USD	β_{Local} USD	World β_{μ} USD	β_0 USD	Local β_{μ} USD	β_0 USD
0,97	0,73	0,1796	1,70	1,68	0,88
0,2280	0,0990	0,299	0,1796	0,1806	0,0825
0,077	0,205	0,701	0,299	0,291	0,351
0,923	0,795	0,701	0,701	0,709	0,649

	MSCI AC WORLD - Price index (USD)	Merval - Price index (USD)	IRSA, Price Index (USD)
Volatility:			
Deviation			
Annual St.Dev (Total risk):	0,0593	0,1462	0,1768
Relative St.Dev (Relative to MSCI World)		2,4660	2,9806
Deviation (July 2002 - Today)			
Annual St.Dev (Total risk):	0,0597	0,1277	0,2034
Relative St.Dev (Relative to MSCI World)		2,1529	3,4297
Semi Deviation			
Annual Semi Deviation (Rt-y;0)	0,0445	0,1066	0,1211
Annual Semi Deviation (Rt;0)	0,0432	0,1068	0,1236
Semi Deviation (July 2002 - Today)			
Annual Semi Deviation (Rt-y;0)	0,0443	0,0928	0,1369
Annual Semi Deviation (Rt;0)	0,0427	0,0816	0,1319

Appendix MetroGAS Valuation

Last reported share value (yahoo finance, 26.07.06)	1,02
Corporation Tax	35,00 %
Cost of Debt	7,00 %
Debt/debt+equity	71,37 %
NO of shares	657968
Market cap	189530
Share of sales in domestic market:	100 %

Period: 1996 - Today

	Downside Beta			
	World	Local	World	Local
CAPM	β_{World}	β_{Local}	β_{World}	β_{Local}
CE:	8,7 %	14,2 %	12,0 %	15,0 %
WACC	5,7 %	7,3 %	6,7 %	7,5 %
DCF	7816,6	7279,0	7481,6	7204,0
Terminal Value	551549,2	160461,1	225730,4	143950,8
DCF + Terminal Value ARS	1711659,5	513284,7	713628,7	669943,3
Excess Cash	505,9	505,9	505,9	505,9
Long-term Debt	0,0	0,0	0,0	0,0
Company Value	1711153,5	512778,8	713122,7	669437,4
Share value	2,6	0,8	1,1	1,0
				0,7

Period: July 2002 - Today

	Downside Beta			
	World	Local	World	Local
CAPM	β_{World}	β_{Local}	β_{World}	β_{Local}
CE:	10,5 %	15,2 %	14,6 %	16,6 %
WACC	6,3 %	7,6 %	7,4 %	8,0 %
DCF	7628,8	7178,9	7239,7	7055,7
Terminal Value	309771,7	139048,5	151444,5	118477,7
DCF + Terminal Value ARS	971245,4	447455,7	485573,8	384132,2
Excess Cash	505,9	505,9	505,9	505,9
Long-term Debt	0,0	0,0	0,0	0,0
Company Value	970739,5	446949,8	485067,9	493738,9
Share value	1,5	0,7	0,7	0,6
				0,6

1996 - Today		World		β_{World}	
Period:	Downside Beta and added country risk premium	Sovereign Yield Spread	Weighted value sales domestic:	Equally weighted value:	
CE:	15,6 %	16,0 %	12,3 %	14,2 %	13,5 %
WACC	7,7 %	7,8 %	6,8 %	7,3 %	7,1 %
DCF	7143,4	7110,4	7458,8	7279,0	7337,6
Terminal Value	132554,5	126964,3	216266,2	160461,1	175656,5
DCF + Terminal Value ARS	427475,5	410268,6	684598,7	513284,7	559961,9
Excess Cash	505,9	505,9	505,9	505,9	505,9
Long-term Debt	0,0	0,0	0,0	0,0	0,0
Company Value	426969,5	409762,6	684092,8	512778,8	559456,0
Share value	0,6	0,6	1,0	0,8	0,9

July 2002 - Today		World		β_{World}	
Period:	Downside Beta and added country risk premium	Sovereign Yield Spread	Weighted value sales domestic:	Equally weighted value:	
CE:	18,2 %	18,0 %	14,1 %	15,2 %	15,4 %
WACC	8,4 %	8,4 %	7,3 %	7,6 %	7,7 %
DCF	6915,4	6927,4	7282,0	7178,9	7164,9
Terminal Value	100394,1	101764,3	161176,0	139048,5	136433,3
DCF + Terminal Value ARS	328367,2	332596,6	515481,6	447455,7	439410,5
Excess Cash	505,9	505,9	505,9	505,9	505,9
Long-term Debt	0,0	0,0	0,0	0,0	0,0
Company Value	327861,2	332090,7	514975,7	446949,8	438904,5
Share value	0,5	0,5	0,8	0,7	0,7