CANBACK DANGEL PREDICTIVE MODELING: CASE EXAMPLE FROM RUSSIA

July 2005

PREDICTIVE
ANALYTICS
INTEGRATORS

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Introduction

This document is an example of how Canback Dangel develops predictive models for hard-to-analyze markets.

The example uses the Golder Tellis predictive model as its foundation

The client, a high-end small appliances maker, was concerned with where Russia was heading and how the markets outside of Moscow would develop over the next several years.

The predictive model was built in late 2004 and used economic/demographic data up till 2003 and audited category data up till August 2004

XCo should continue to invest in the attractive Russian market with a focus on the regions. The Moscow market is nearing steady-state growth

Russia will continue to represent an important opportunity for XCo:

• The Russian economy will continue to exhibit high growth with excellent economic fundamentals in the medium term, but poor demographics will dampen long-term prospects

• The Russian small appliance markets within Segment A, Segment B, and Segment C are poised to grow at 8-46 percent per year over the several years, depending on segment

• Distribution reach is a prerequisite to success with consumer markets expanding beyond Moscow

The Russian economy will continue to exhibit high growth with excellent economic fundamentals in the medium term, but poor demographics will dampen long-term prospects

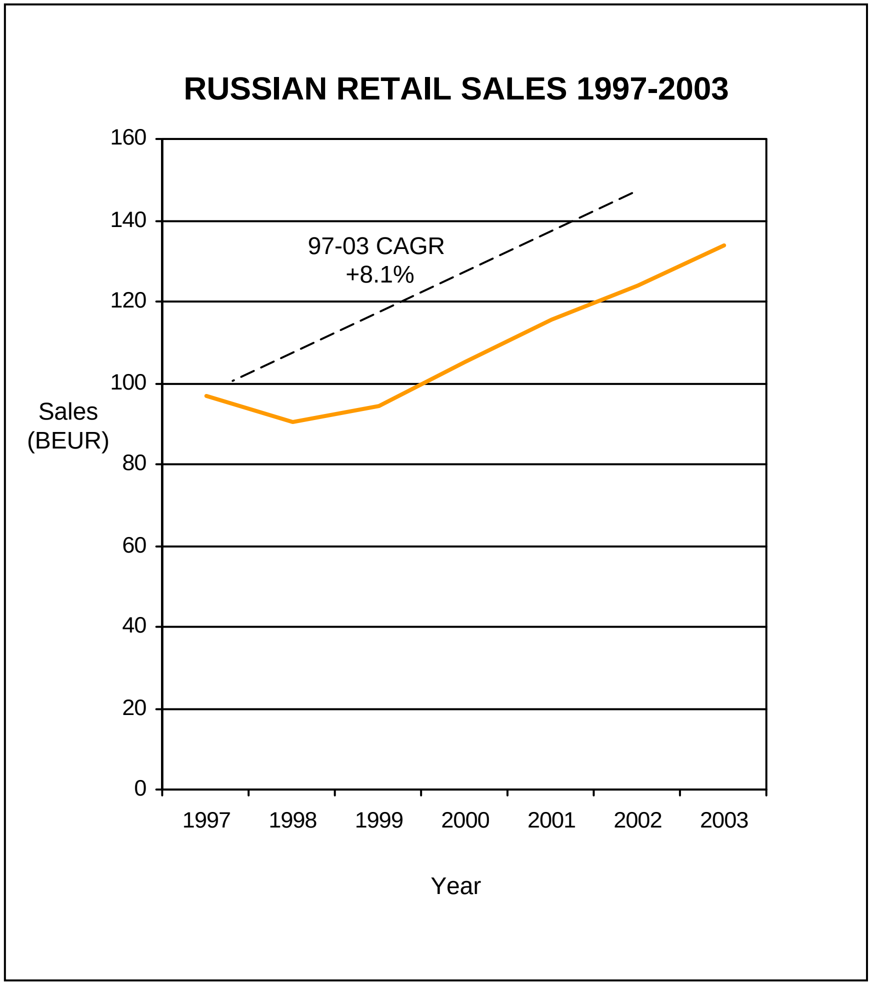
- Russia can be expected to continue its rapid growth over the next several years, averaging 5.5-6.0% annual growth in GDP and even higher growth in retail sales

- There are few foreseeable threats to this prediction, but the fixed exchange rate is an issue
    - The Russian economy is well managed and the leading indicators (except money-supply growth) for economic crisis behave well
    - Oil prices are unlikely to decline substantially, but do not seem likely to rise either
    - Consumer credit, while increasing, is low
    - However, the currency is becoming increasingly overvalued

- Longer term, the demographic disequilibrium will strain the Russian society and long term GDP growth (10 years out) is unlikely to be more than 4% per annum
    - The population is rapidly declining
    - People live in the wrong geographic areas and large cities (except Moscow and perhaps St.-Petersburg) are too small to serve as engines of growth

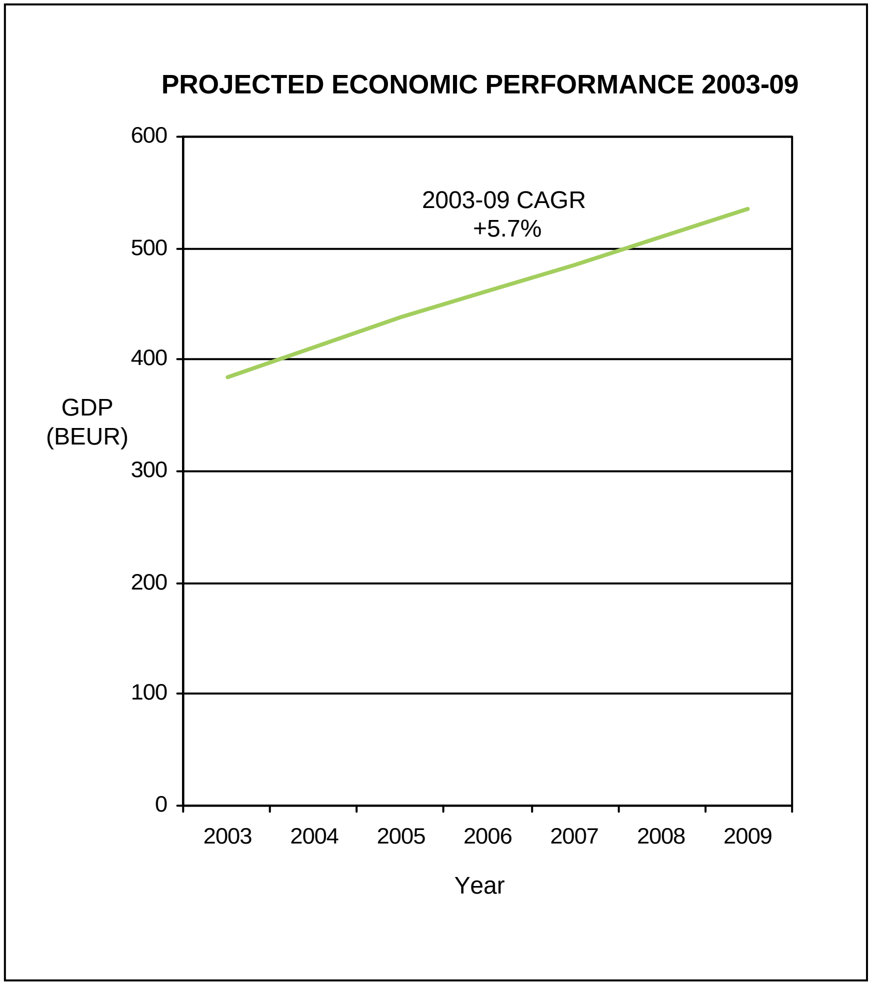
- The main risk to the economy is political in nature and unpredictable

The Russian economy has done well since 1998, when the post-communist decline ended after a short financial crisis



Source: OECD, Goskomstat

The economic outlook for Russia remains highly positive with GDP per capita annual growth expected in the 5-8% range and retail sales growing at 9% per year



Source: IMF, Goskomstat, Canback Dangel analysis

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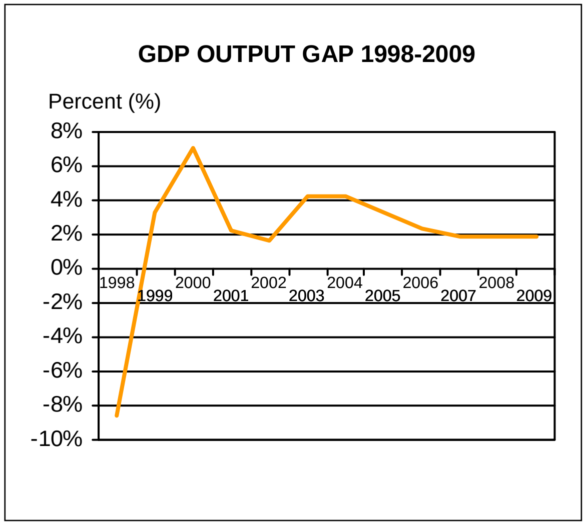
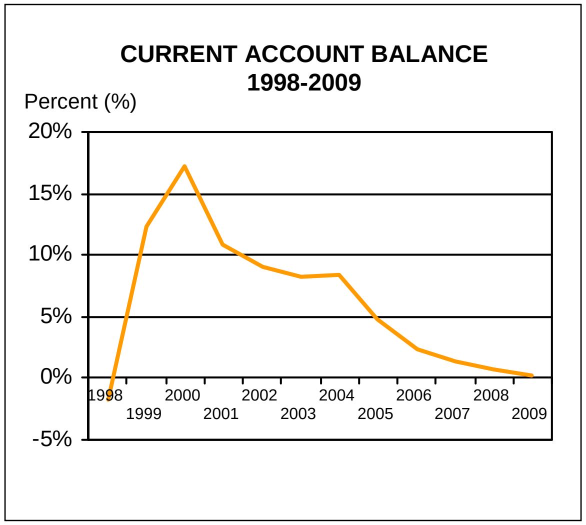
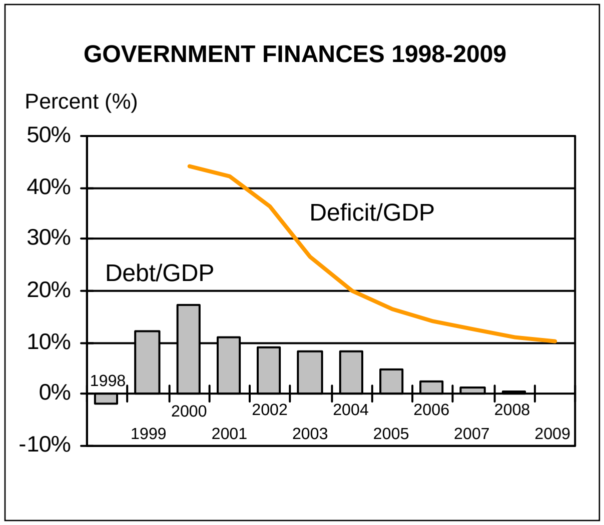
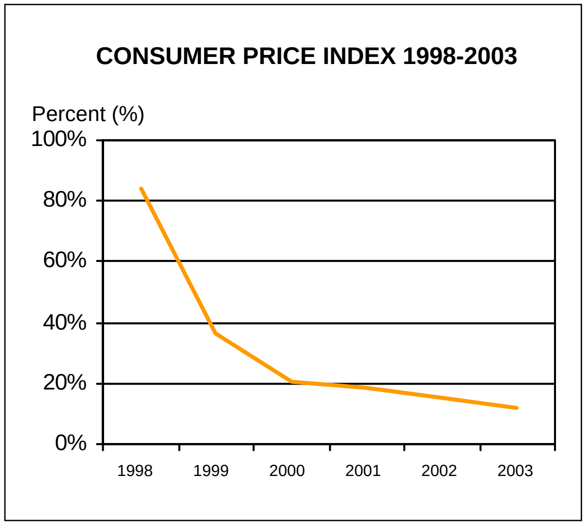
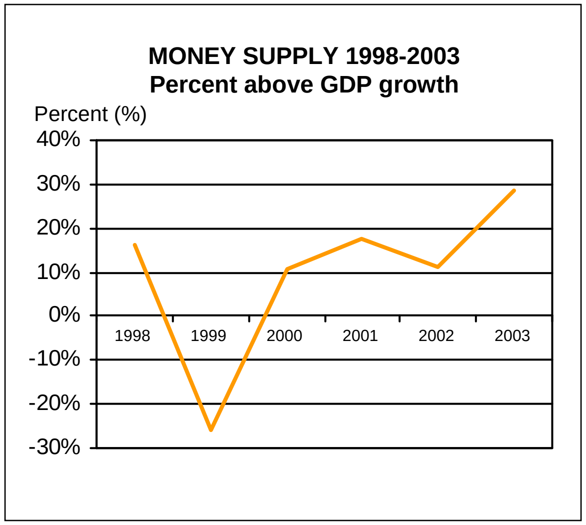










- Russia performs well on all expect one of the leading indicators for potential problems
- Money supply growth and commensurate inflation are viewed as the major threats to sustained economic growth
- However, high inflation combined with an essentially fixed exchange rate will lead to a need to devalue the currency sooner or later

Source: IMF, Goskomstat, Canback Dangel analysis

Consumer credit has grown explosively recently

• 50% growth in last 6 months

• Consumer credit stands at 13 billion euros, around 3% of GDP

Risk is mitigated since

• Much of Russian consumer credit is foreign-sourced with well-balanced maturities

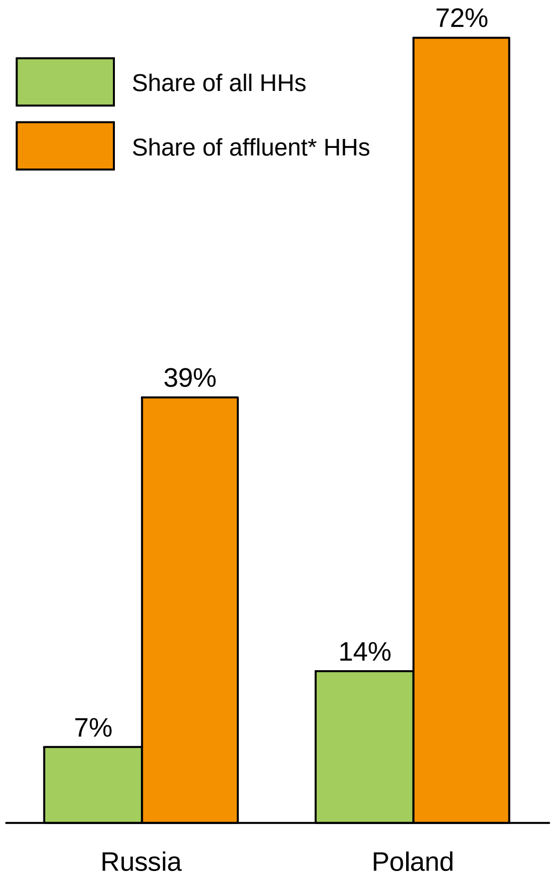
• Generally low levels of borrowing as % of GDP

• Default rates low at between 2 - 3%

In a downturn, financial institutions may suffer some credit losses, but since overall exposure is small as a % of GDP and much of the credit is foreign, it is unlikely to be the cause of a downturn

CONSUMER CREDIT'S SHARE OF DISPOSABLE INCOME

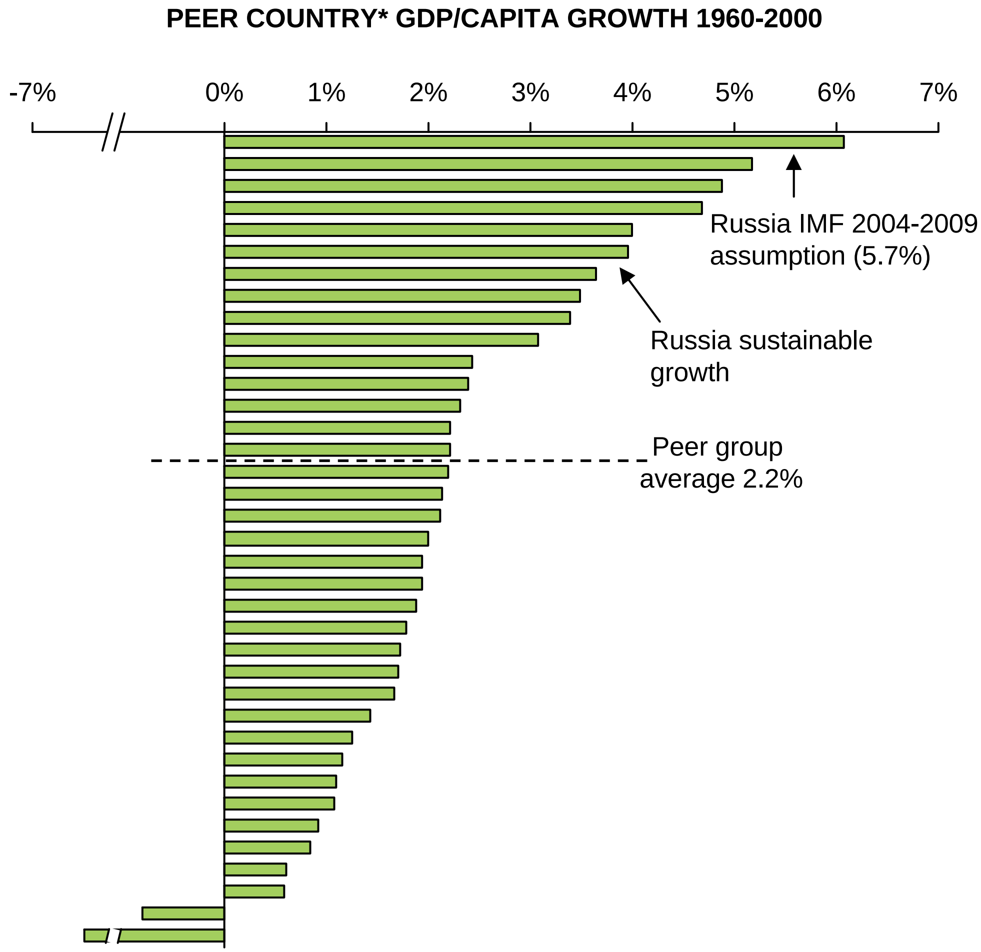
Mid-2004



* Affluent households defined as having disposable income > EUR 12,000

Source: *Business Week,* Goskomstat, C-GIDD, Canback Dangel analysis

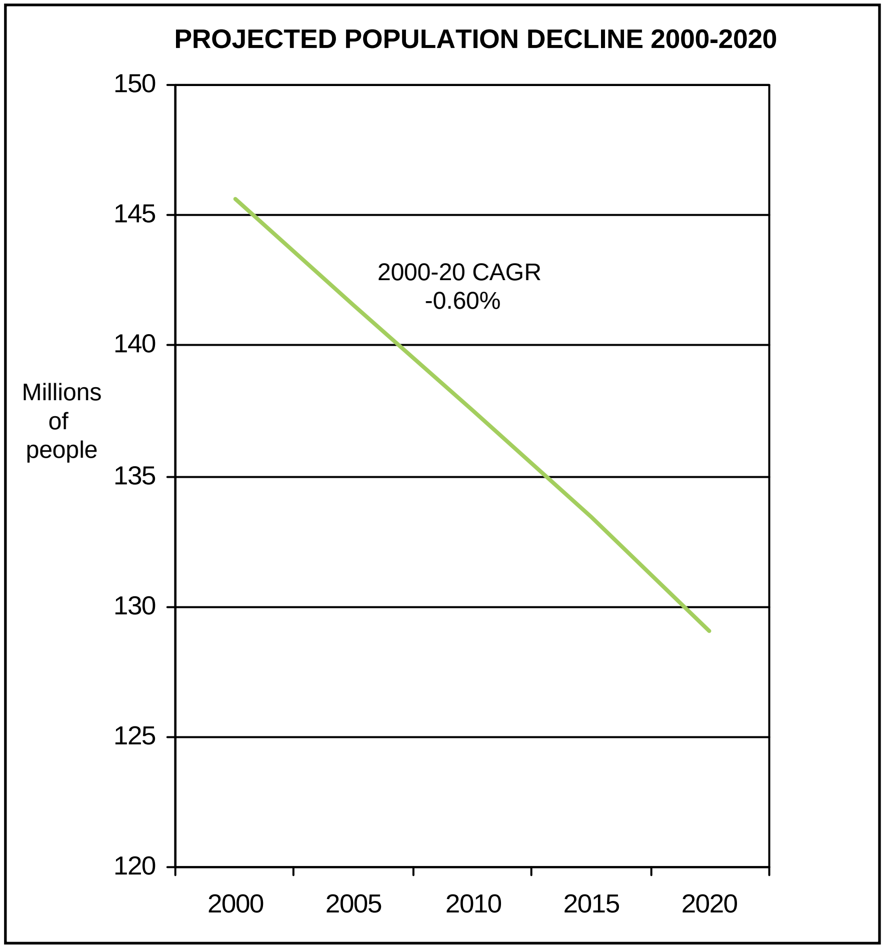
Russia's sustainable GDP per capita growth rate, however, is in the 3-4% range, but there are good reasons to believe higher growth is possible over the next several years

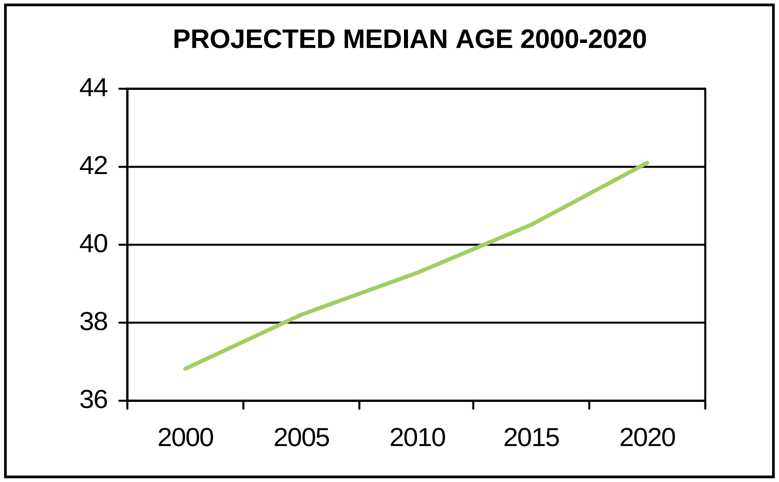


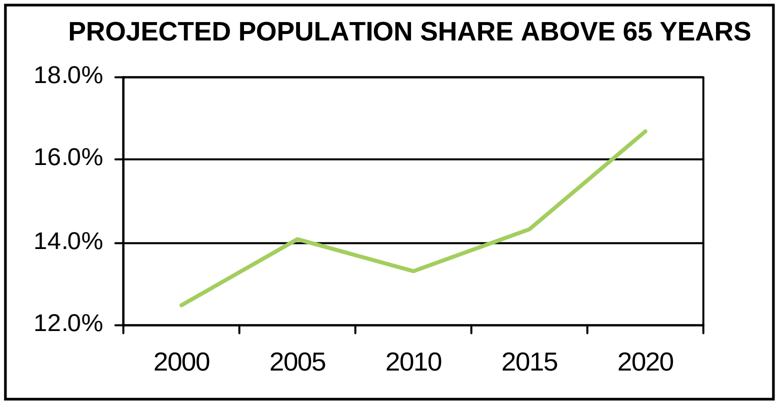
- Only 1 of 40 countries has had a sustained economic growth above the IMF forecast
- However, Russia's peculiar post-communist situation has led to pent-up consumer demand
- Further, world oil prices in the IMF scenario are projected at $28-32, perhaps too conservative. $1 increase in per barrel price leads to 0.3-0.5%-point increase in GDP growth
- On a cautionary note though, consumer spending is already a high proportion of GDP (58%) and can most likely not exceed 62%
- And, of 10 oil price forecasters tracked by the US Department of Energy, the IMF assumption is the 3rd highest

* Based on a sample of 40 countries at a similar stage of economic development.
Source: C-GIDD, Canback Dangel analysis

Longer term, the population is rapidly declining and aging, posing a threat to economic progress



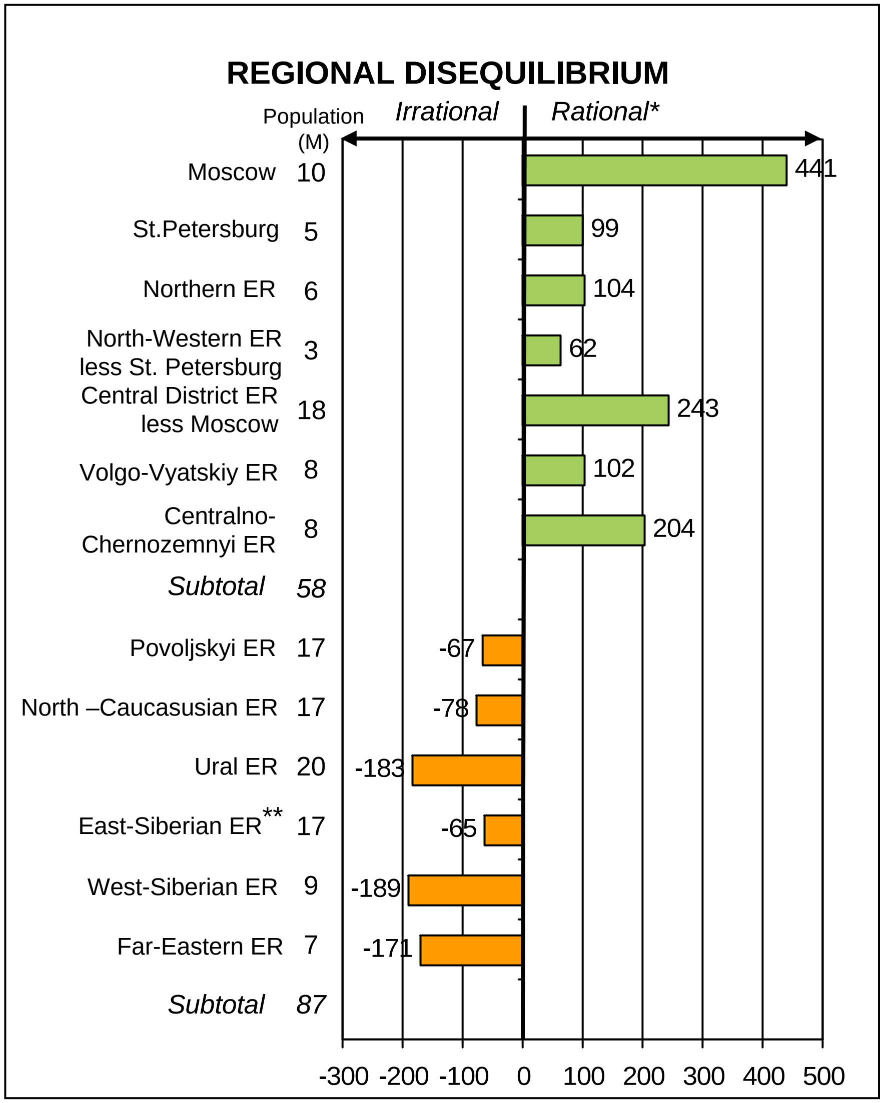


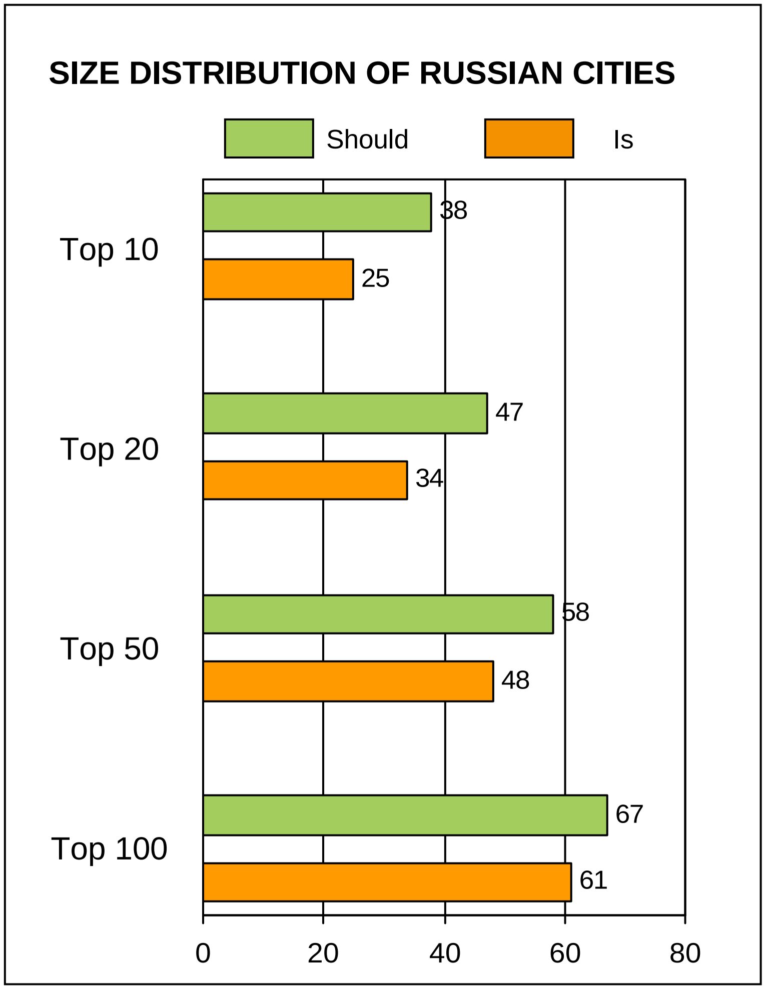


President Putin: “We face the real danger of becoming a senile nation…If this trend continues, the very survival of the nation will be under threat” (First state-of-the-nation speech to the Duma, 2000)

Source: C-GIDD, BBC News

In addition, as a legacy of the Soviet era, people live in the wrong places





- **Too many people live in the wrong regions**
- **Large cities are too small**

* From a geographic and resources perspective. ** Excludes Tumen, Krasnoyar, Kemerova
Source: Bradshaw and Vartapetov (left), World Bank (right), Canback Dangel analysis

- Massive internal migration towards the Heartland to provide work opportunities

- 500,000 immigrants per year to keep population stable

- Growth of large cities but not always the currently large cities: major difference between the winners and the losers.

- Strain on public services with, arguably, calls for higher taxes

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• The Russian small appliance markets within Segment A, Segment B, and Segment C are poised to grow at 8-46 percent per year over the several years, depending on segment

• Distribution reach is a prerequisite to success with consumer markets expanding beyond Moscow

The Russian market within XCo's segments is poised to grow at 8-46 percent per year over the next 6 years, depending on category

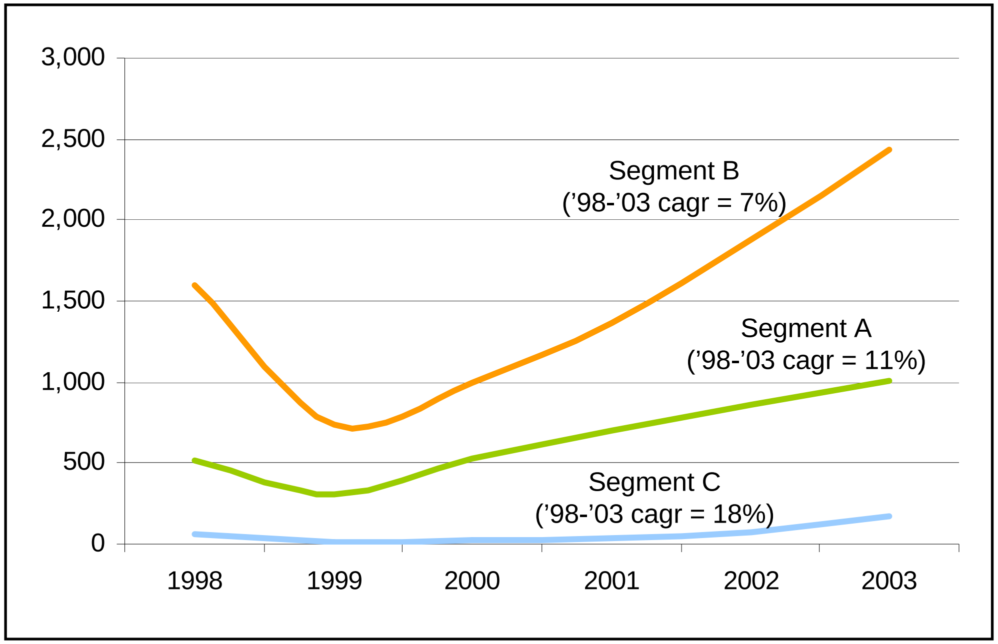
- The Russian market within the 3 segments has shown strong growth after the 1998-99 crisis, with annual unit sales increases often in the 30-40% range within the audited markets (8 cities)

- This post-crisis growth masks the slower underlying growth which is in the 10-20% range per annum, with a remarkable spurt in 2003 and 2004

- Going forward, all three segments will likely continue to grow at a healthy rate. However, penetration in the Moscow market will reduce growth in Segment A and Segment B significantly. In the later years (2008 and 2009), these categories may even decline in Moscow, even if the economy continues to grow at the forecasted rate

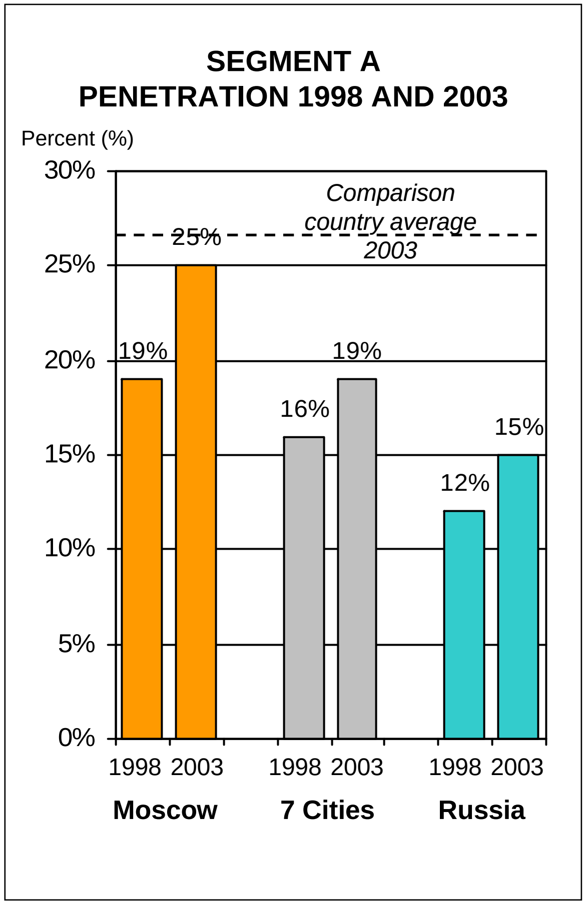
The Russian market for XCo products has grown substantially since 1998

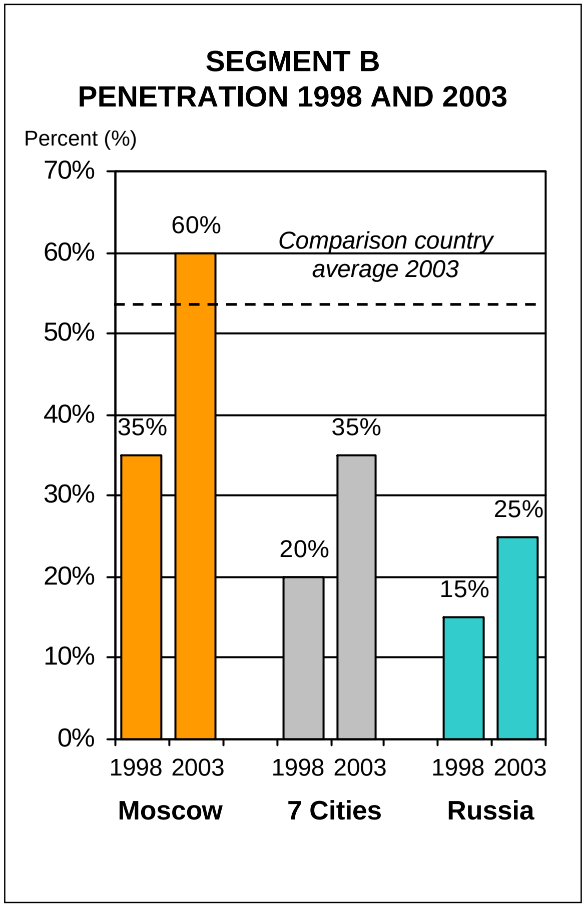
UNIT SALES OVER TIME IN RUSSIA
Thousands of units

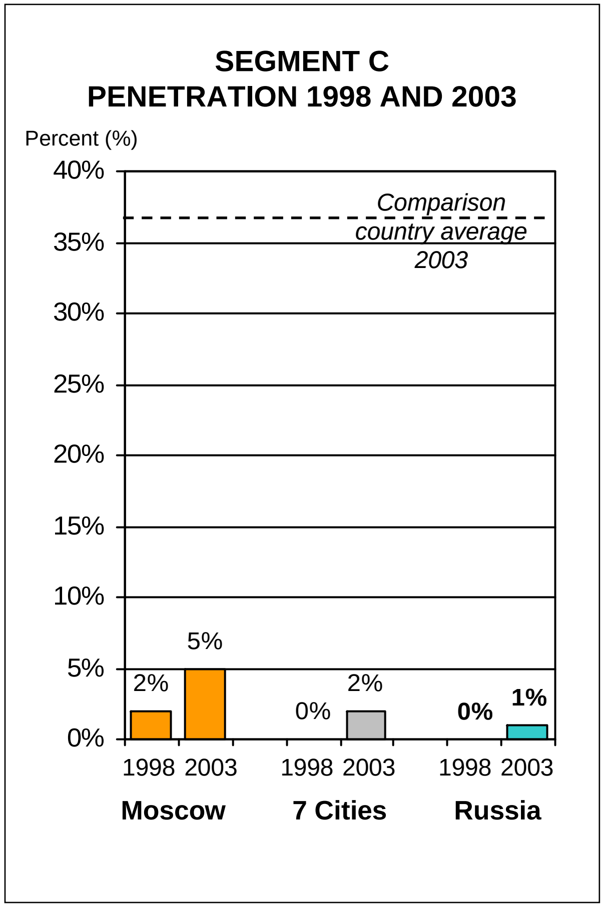


- All segments declined dramatically in sales in 1999 (between 41 and 74%) in response to the fiscal crisis in 1998, and steadily recovered between 2000 –2003
- Segment A growth rate slowed to 17% in 2003, from a rate around 40% 1999-2002
- Segment B growth rate slowed somewhat to 29% in 2003, from a rate of 37% 1999-2002
- Segment C growth rate accelerated to 145% in 2003

There is, however, a high risk of saturation in Moscow in Segment A and Segment B







Source: Canback Dangel analysis

To assess the prospects for future growth, a statistical model was developed. It incorporates data from 12 European markets

COMPARISON MARKETS

Austria
Czech Republic
Finland
Germany
Hungary
Poland
Portugal
Russia: Moscow
Russia: 7 large cities
Spain
Sweden
Turkey: 3 large cities

DATA

Quarterly category data for

- Units sold
- Revenue
- Price
- Market shares
- Penetration
- Saturation

Quarterly economic and demographic data

- GDP
- Disposable income
- Population
- Number of households
- Income distribution

STATISTICAL METHOD

Linear regression

Pooled cross-sectional time series data

- 24 quarters (1998-2003)
- 12 markets

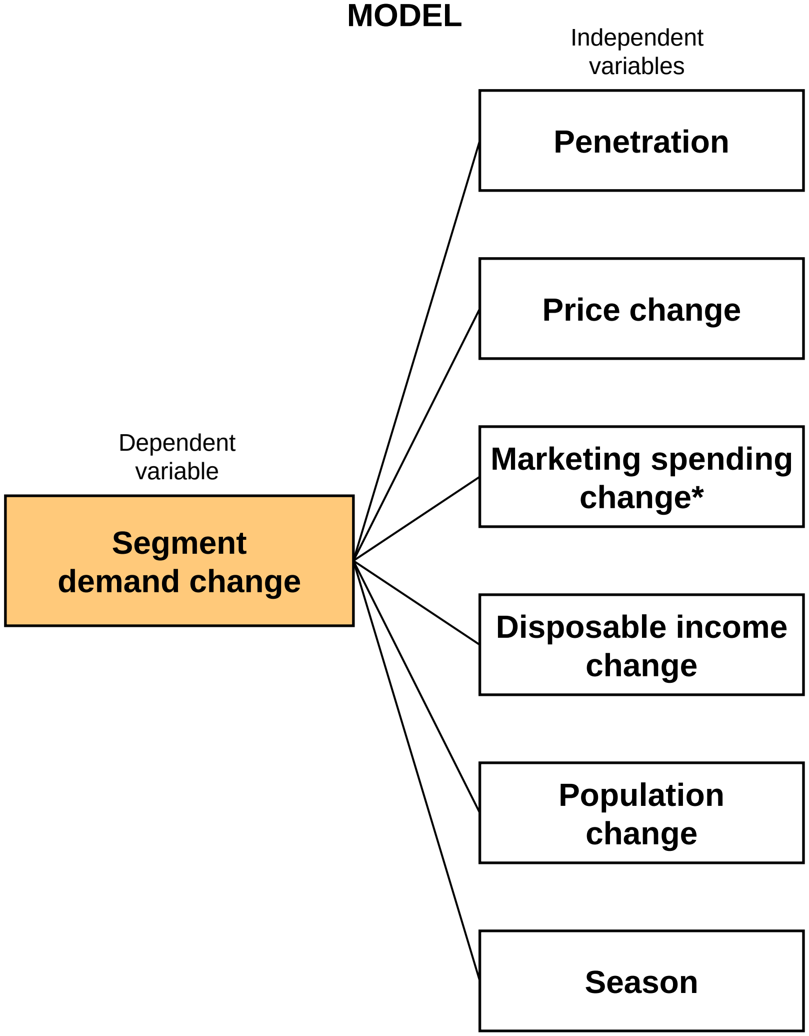
Consensus forecasts of economic and demographic growth

BENEFITS OF STATISTICAL APPROACH

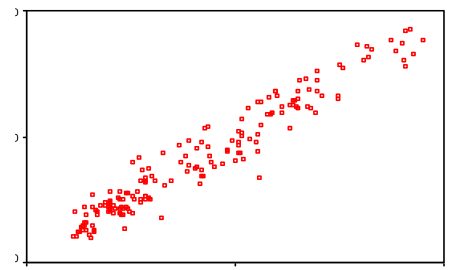
- Pooling of markets constrains model so that projections of Russia's future growth takes consumer behavior in more developed markets into account
- Combination of category and econo-demographic data allows for high explanatory power
- Avoidance of autoregression analysis reduces risk of extrapolating estimates based only on in-market data

Demand is highly predictable for the 3 segments and the demand drivers speak in favor of continued growth

PATH DIAGRAM FOR GENERAL PREDICTIVE MODEL



ACTUAL VS PREDICTED
Example: Segment A



MODEL ACCURACY

Category	R^2
Segment A	0.74
Segment B	0.83
Segment C	0.80

* Based on a separate analysis of XCo only
Source: Canback Dangel

The statistical model is robust and the pooling-of-data method works well

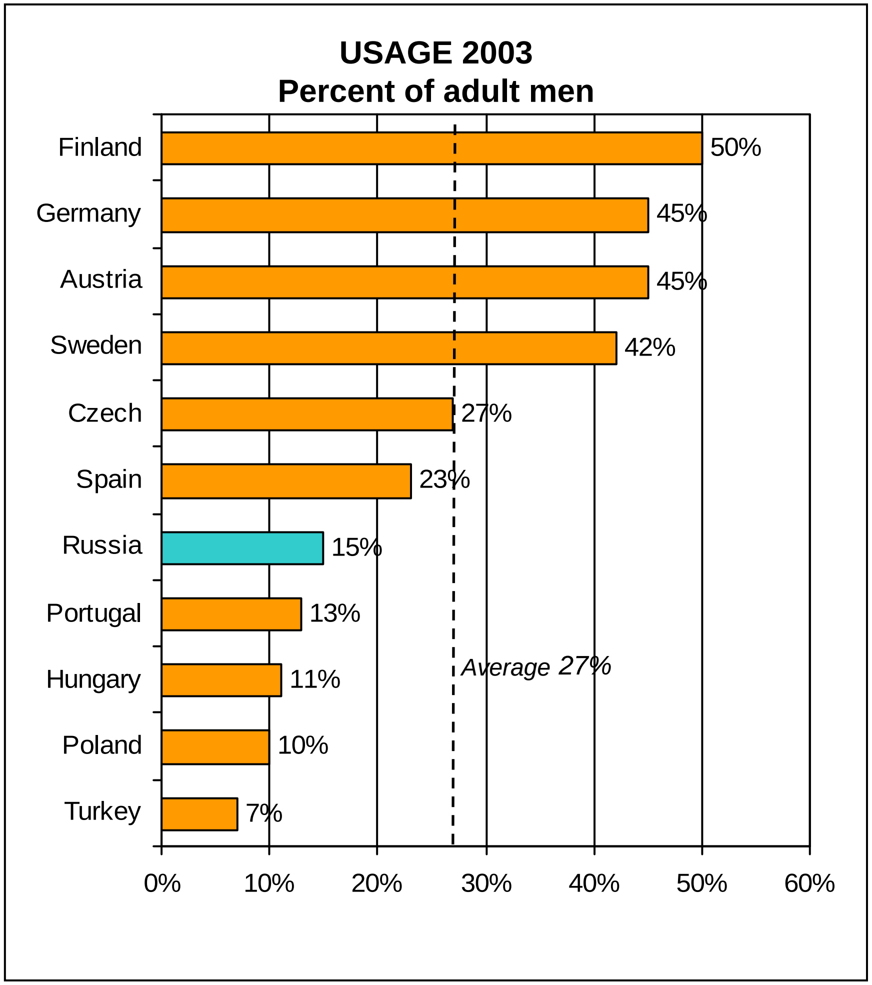
- The Russian market is similar to the other markets in the sample given the economy’s stage of development and the penetration levels for the 3 categories

- Growth is sensitive to Russia’s overall economic development. As a result, the forecasts are fairly accurate in the long term, but less accurate in the short term, where fluctuations in economic performance are hard to predict. Thus, forecasts need to be updated quarterly based on the latest available information to be meaningful

- Overall, the statistical model is fairly accurate in explaining demand for the 3 categories with MAPEs in the 10-15% range

- Potential errors in the underlying category and economic data are likely a much larger source of incorrect forecasting than the statistical model itself

Segment A penetration is still relatively low in Russia



Segment A penetration appears to be dependent on:

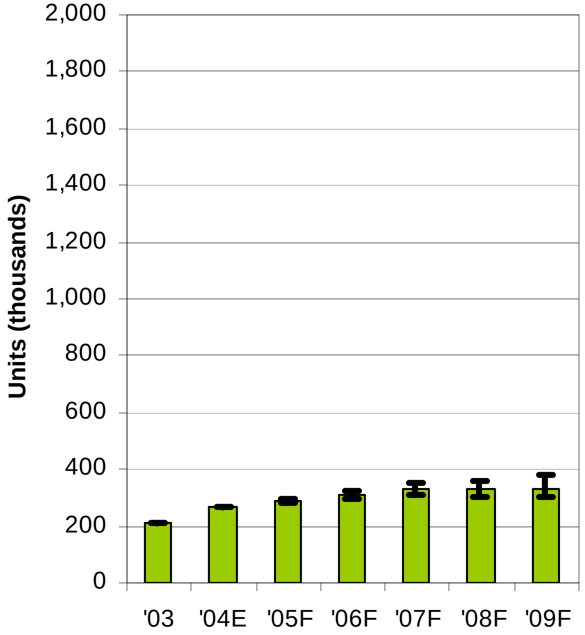
- Standard of living
- Climatic and cultural factors (Germanic countries)

Taking this into account, Russia should be able to reach 30% penetration in a steady state

Source: XCo, GFK, Canback Dangel analysis

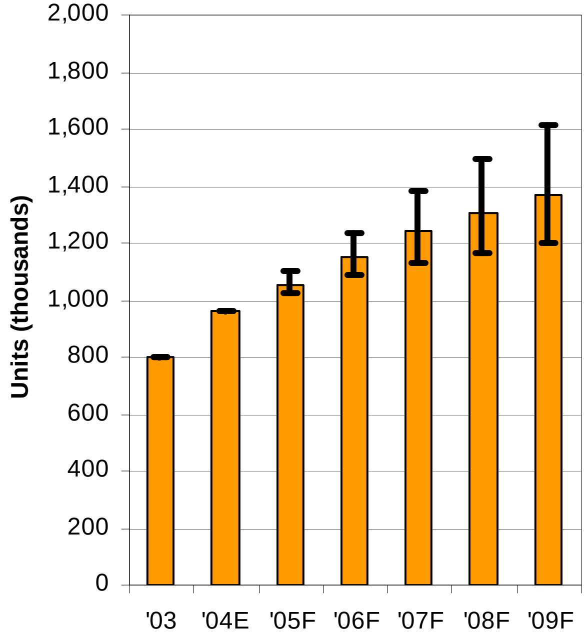
The Moscow market in Segment A is increasingly saturated and will not grow significantly, but regional markets have significant growth potential

MOSCOW UNIT SALES
Segment A
2003 - 2009



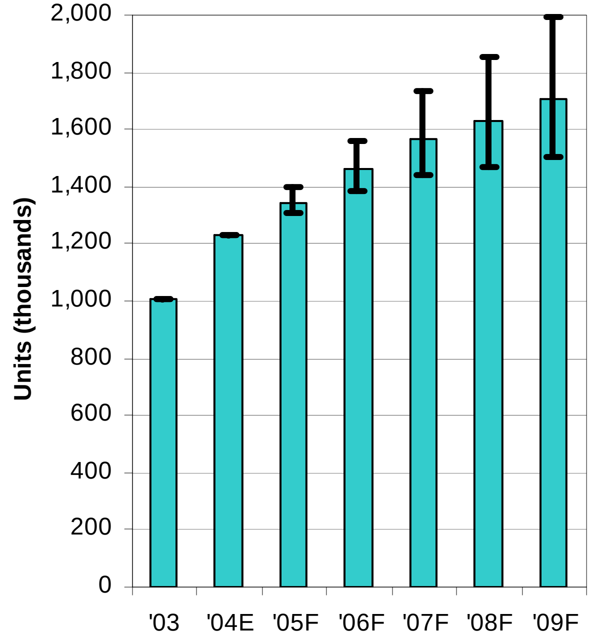
	'03	'04E	'05F	'06F	'07F	'08F	'09F
Units	211	270	289	309	328	328	334
Annual growth		28%	7%	7%	6%	0%	2%

REGIONS' UNIT GROWTH
Segment A
2003-2009



	'03	'04E	'05F	'06F	'07F	'08F	'09F
Units	799	959	1,055	1,150	1,242	1,304	1,369
Annual growth		20%	10%	9%	8%	5%	5%

RUSSIA UNIT GROWTH
Segment A
2003-2009

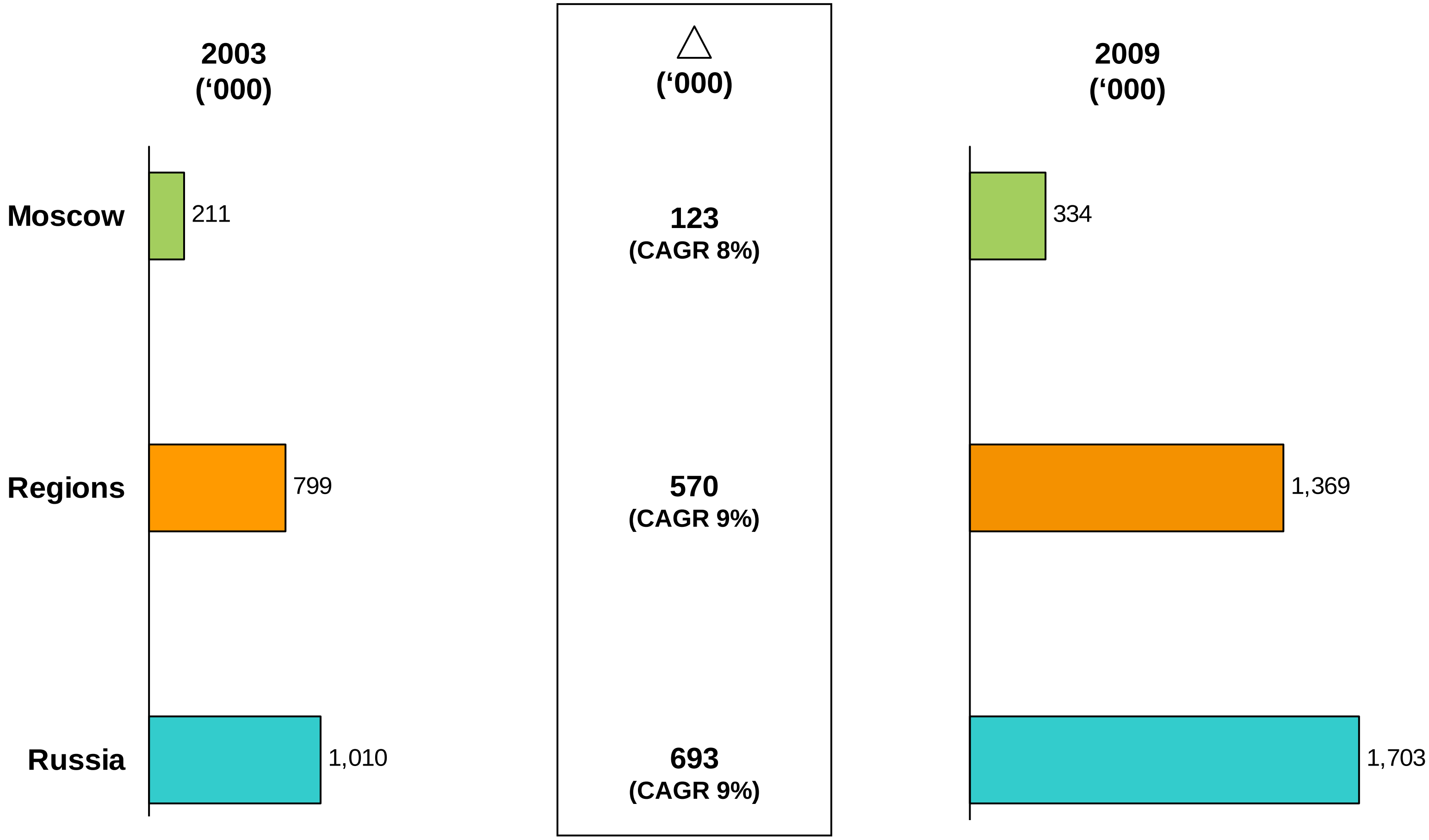


	'03	'04E	'05F	'06F	'07F	'08F	'09F
Units	1,010	1,229	1,344	1,459	1,569	1,631	1,703
Annual growth		22%	9%	9%	8%	4%	4%

Source: Canback Dangel analysis

In Segment A, regional markets will represent the lion's share of the growth opportunity in absolute terms

SEGMENT A PROJECTED MARKET COMPOSITION 2003 AND 2009
Units

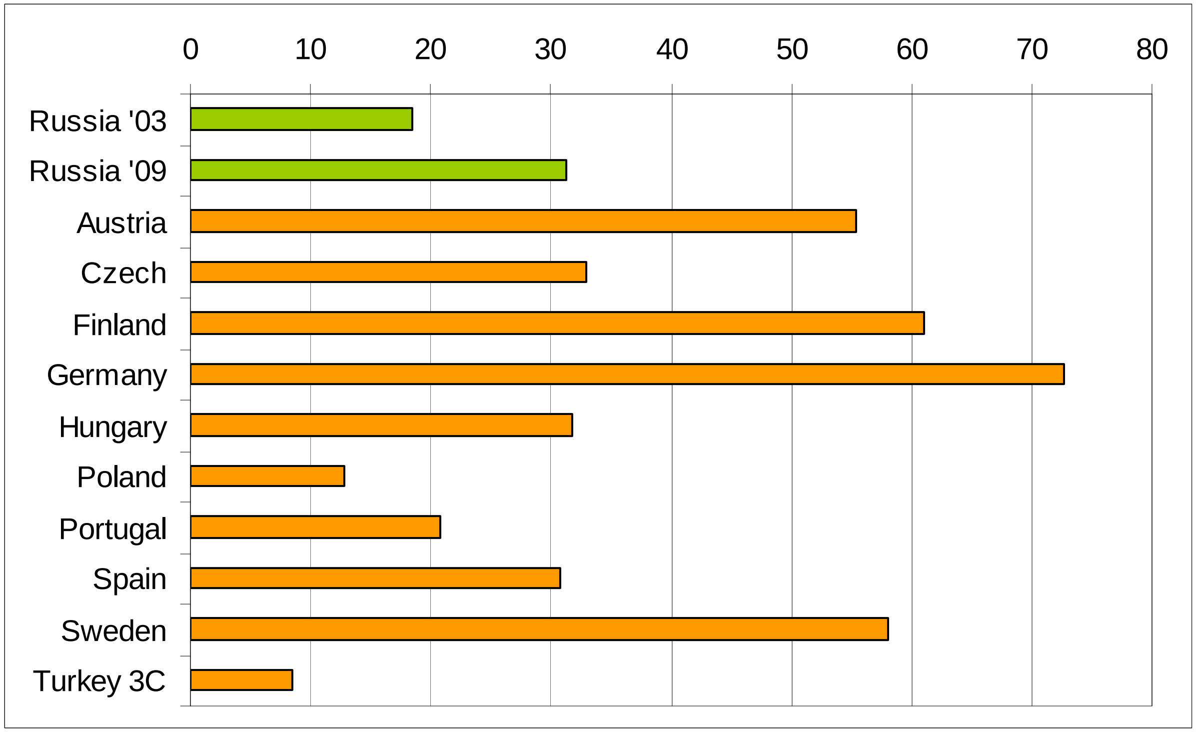


Source: Canback Dangel analysis

Driven by regional market growth, Russia will achieve a sales intensity of about the average of all markets studied

SEGMENT A SALES INTENSITY BY MARKET

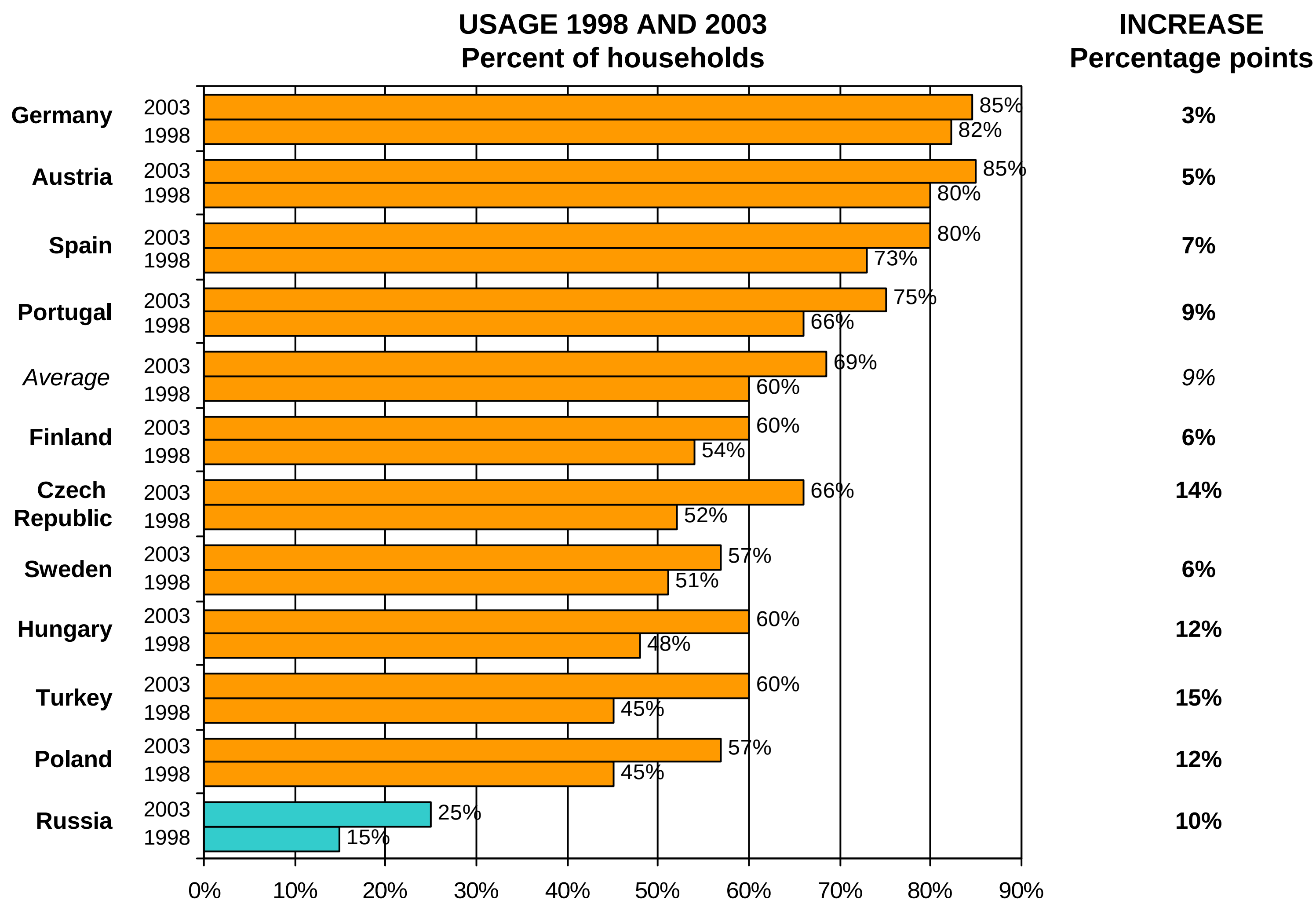
Unit sales per adult male * 1000



- Non-Russian markets are GFK data for 2003
- Russia ’03 is GFK data
- Russia ’09 is based on regression model

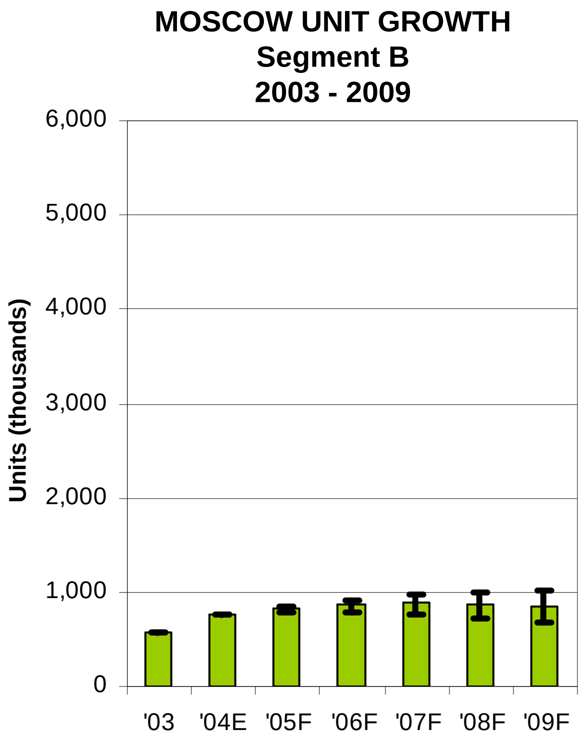
Source: GFK, Canback Dangel analysis

Segment B penetration is low in Russia

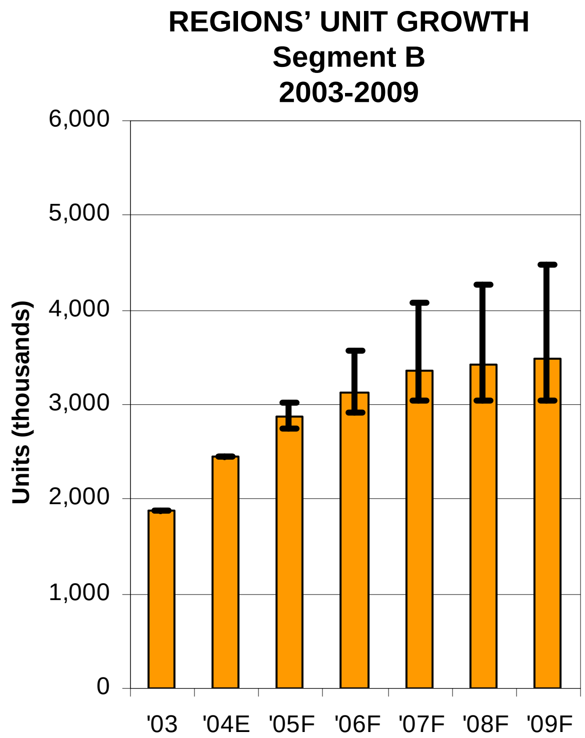


Source: XCo, GFK, Canback Dangel analysis

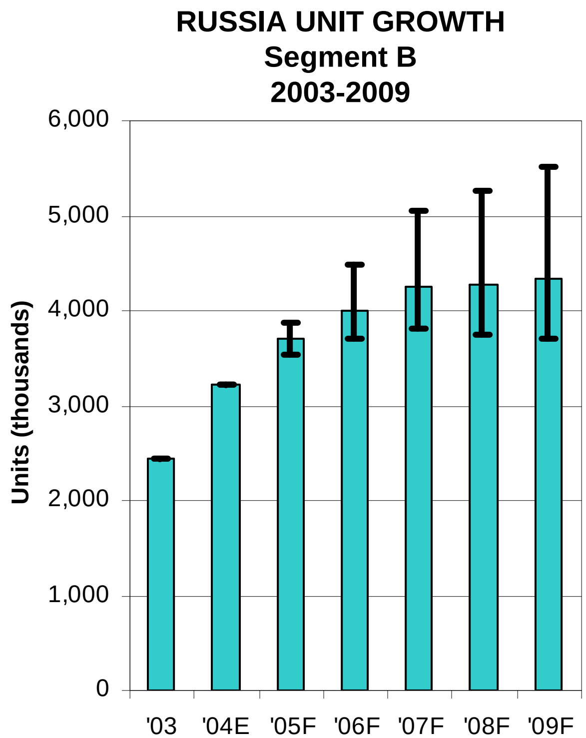
High growth is unsustainable in Moscow as the market becomes increasingly saturated. The regions, however, will see continued strong growth



Units	562	759	819	860	895	859	842
Annual growth		35%	8%	5%	4%	-4%	-2%



Units	1,877	2,459	2,877	3,136	3,355	3,422	3,491
Annual growth		31%	17%	9%	7%	2%	2%

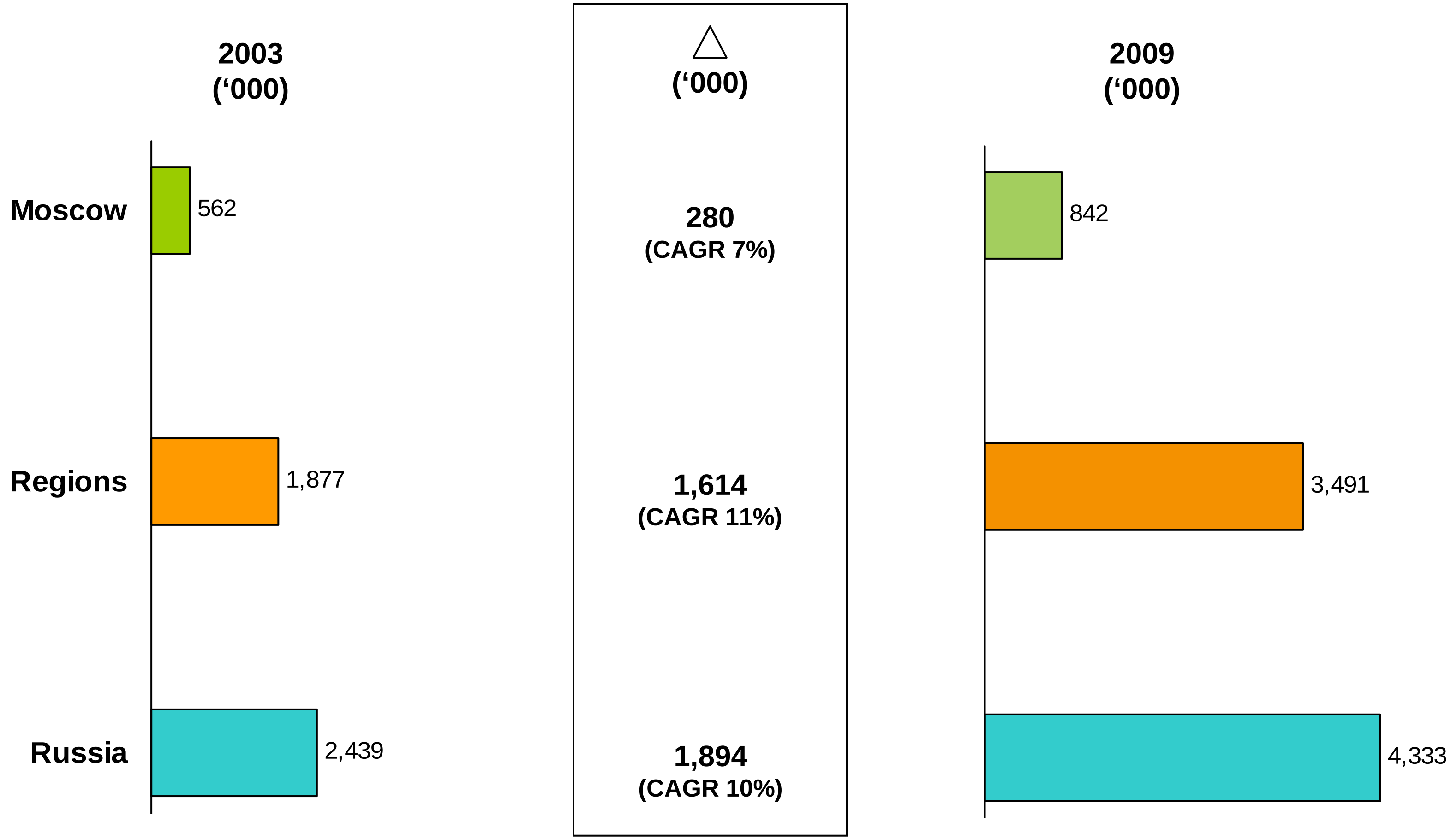


Units	2,439	3,218	3,696	4,140	4,250	4,281	4,333
Annual growth		32%	15%	8%	6%	1%	1%

Source: Canback Dangel analysis

The regions will pick up most of additional sales in Segment B

SEGMENT B
PROJECTED MARKET COMPOSITION 2003 AND 2009
Units

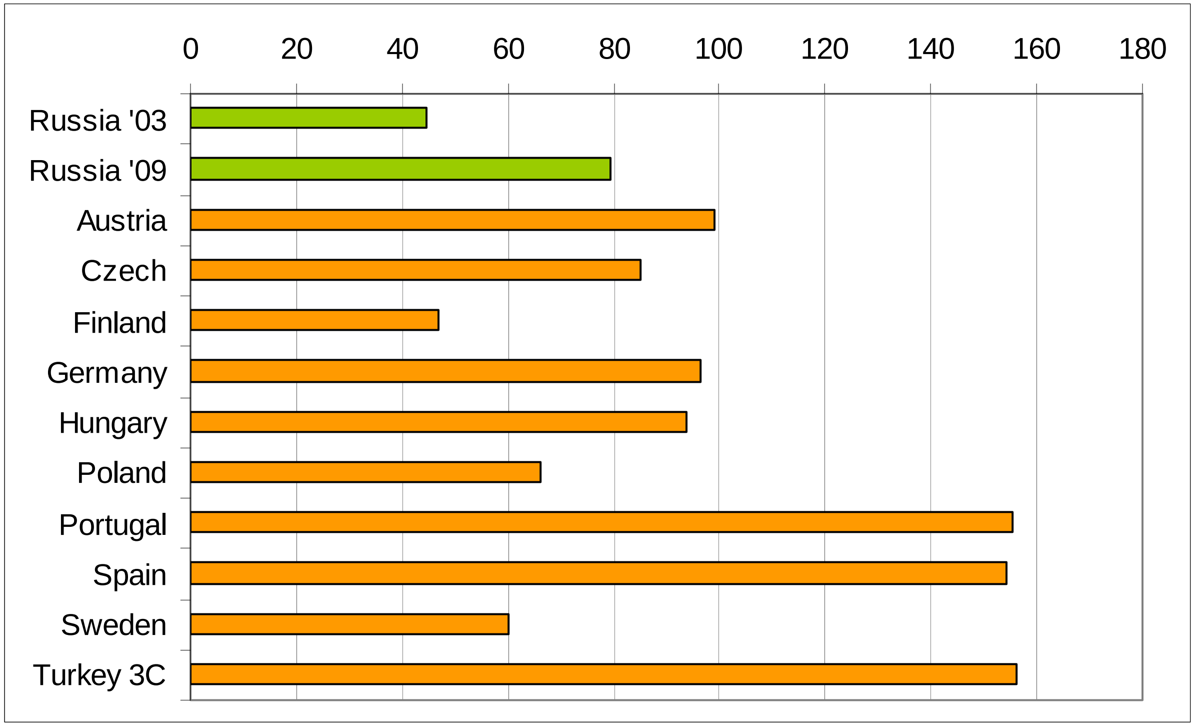


Source: Canback Dangel analysis

In Segment B, the sales intensity is already high and there is downside in the Moscow projection for 2009. However, the current estimate remains the likely scenario, in part because shoppers from the regions continue to go to Moscow

SEGMENT B SALES INTENSITY BY MARKET

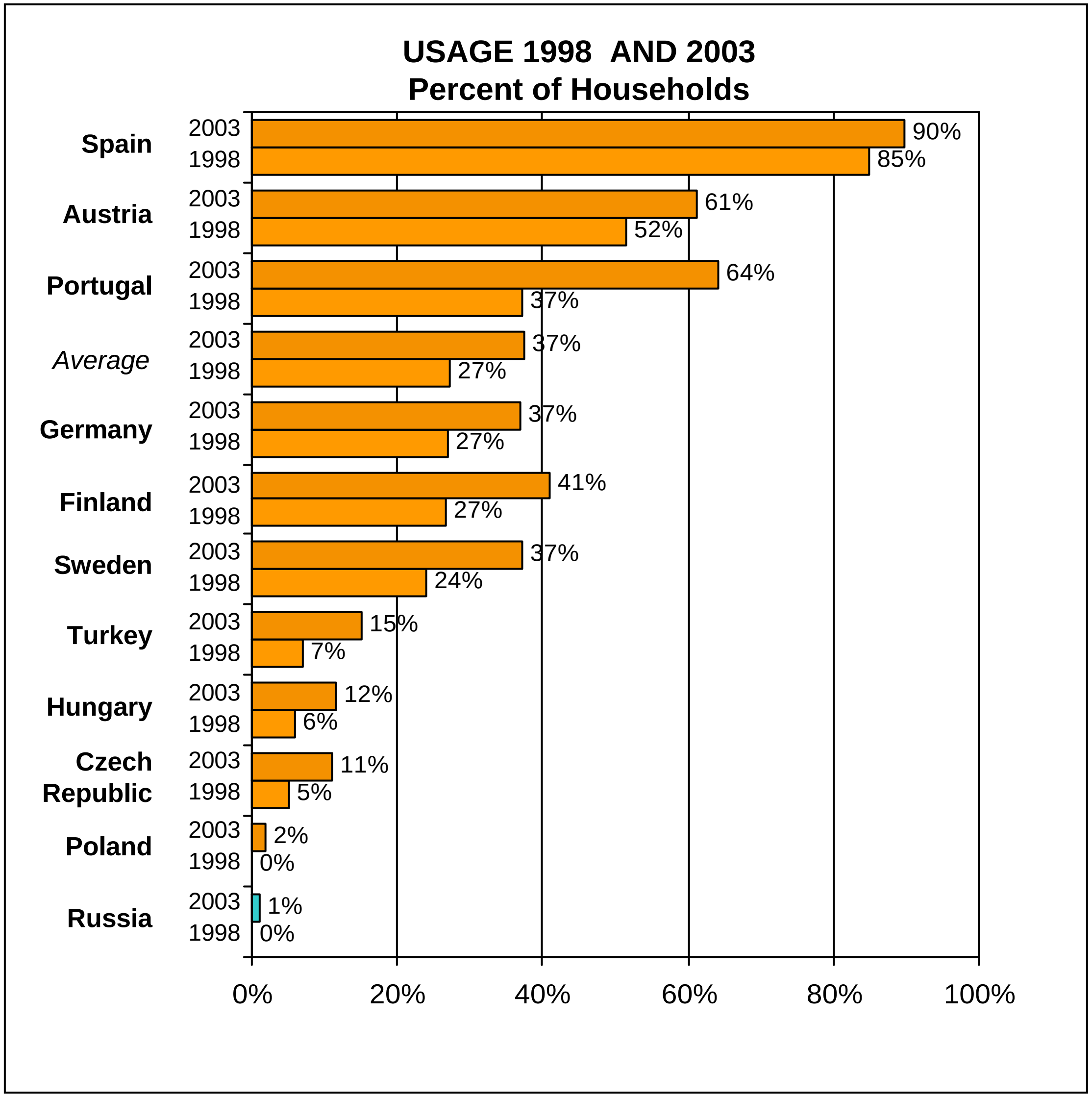
Unit sales per household * 1000

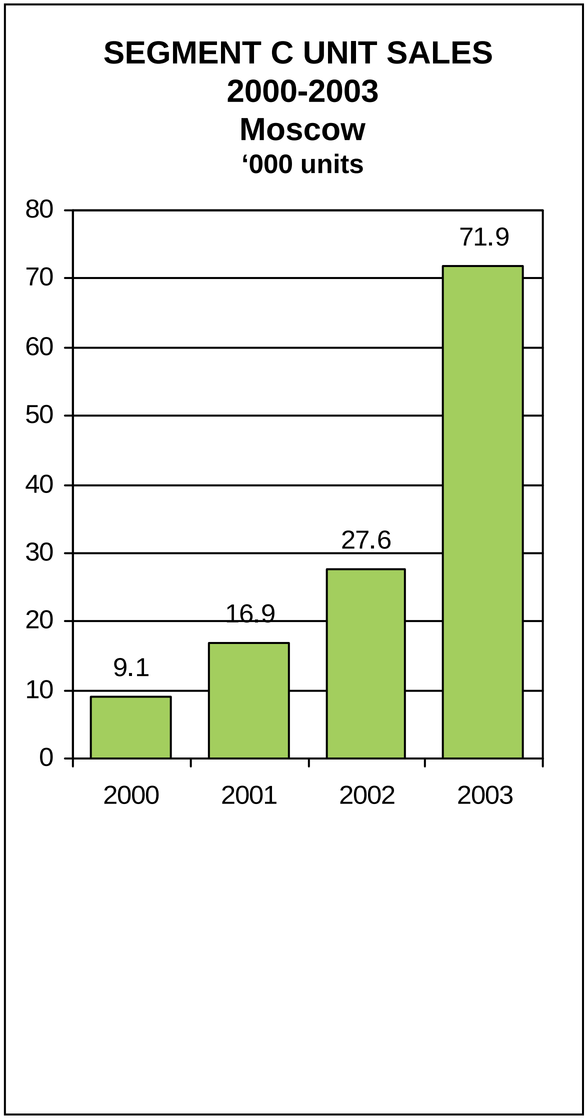


- Non-Russian markets are GFK data for 2003
- Russia '03 is GFK data
- Russia '09 is based on regression model

Source: GFK, Canback Dangel analysis

Russian penetration in Segment C is low but Moscow has taken off over the last 2 years. The same can be expected in the regions

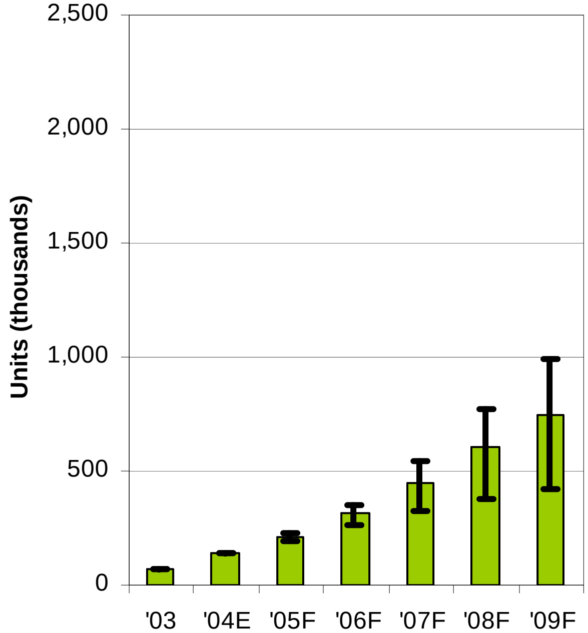




Source: GFK, XCo, Canback Dangel analysis

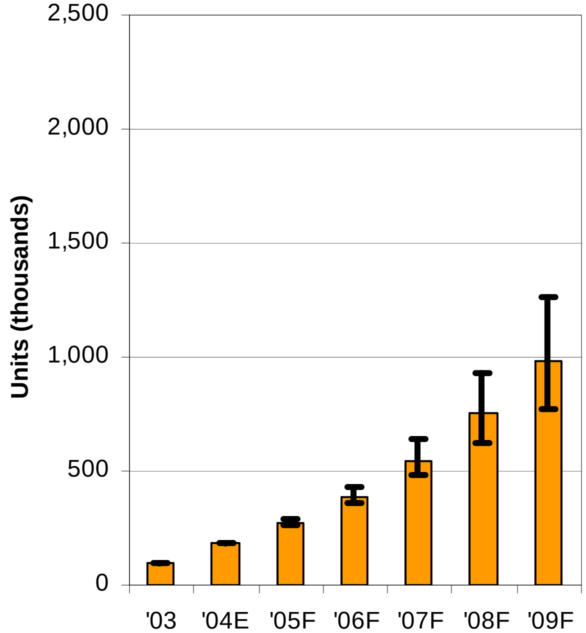
Continued high growth in both Moscow and the regions seems likely in Segment C

MOSCOW UNIT GROWTH
Segment C
2003 - 2009



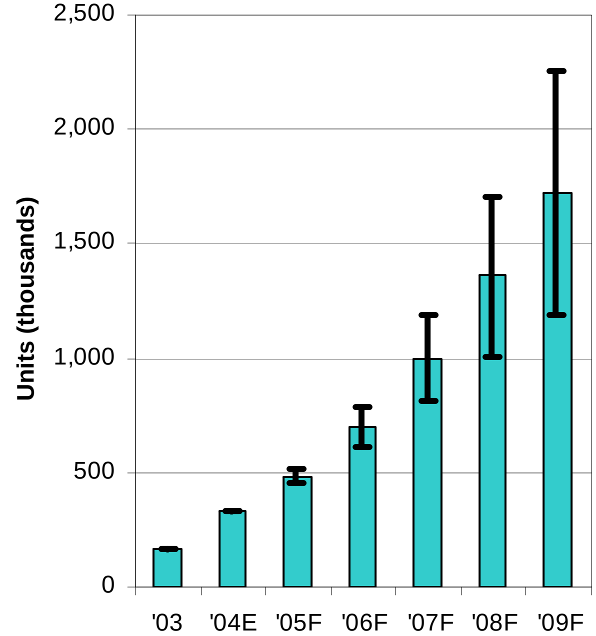
	'03	'04E	'05F	'06F	'07F	'08F	'09F
Units	72	141	210	313	448	605	744
Annual growth		96%	49%	49%	43%	35%	23%

REGIONS' UNIT GROWTH
Segment C
2003-2009



	'03	'04E	'05F	'06F	'07F	'08F	'09F
Units	95	187	269	385	547	755	982
Annual growth		97%	44%	43%	42%	38%	30%

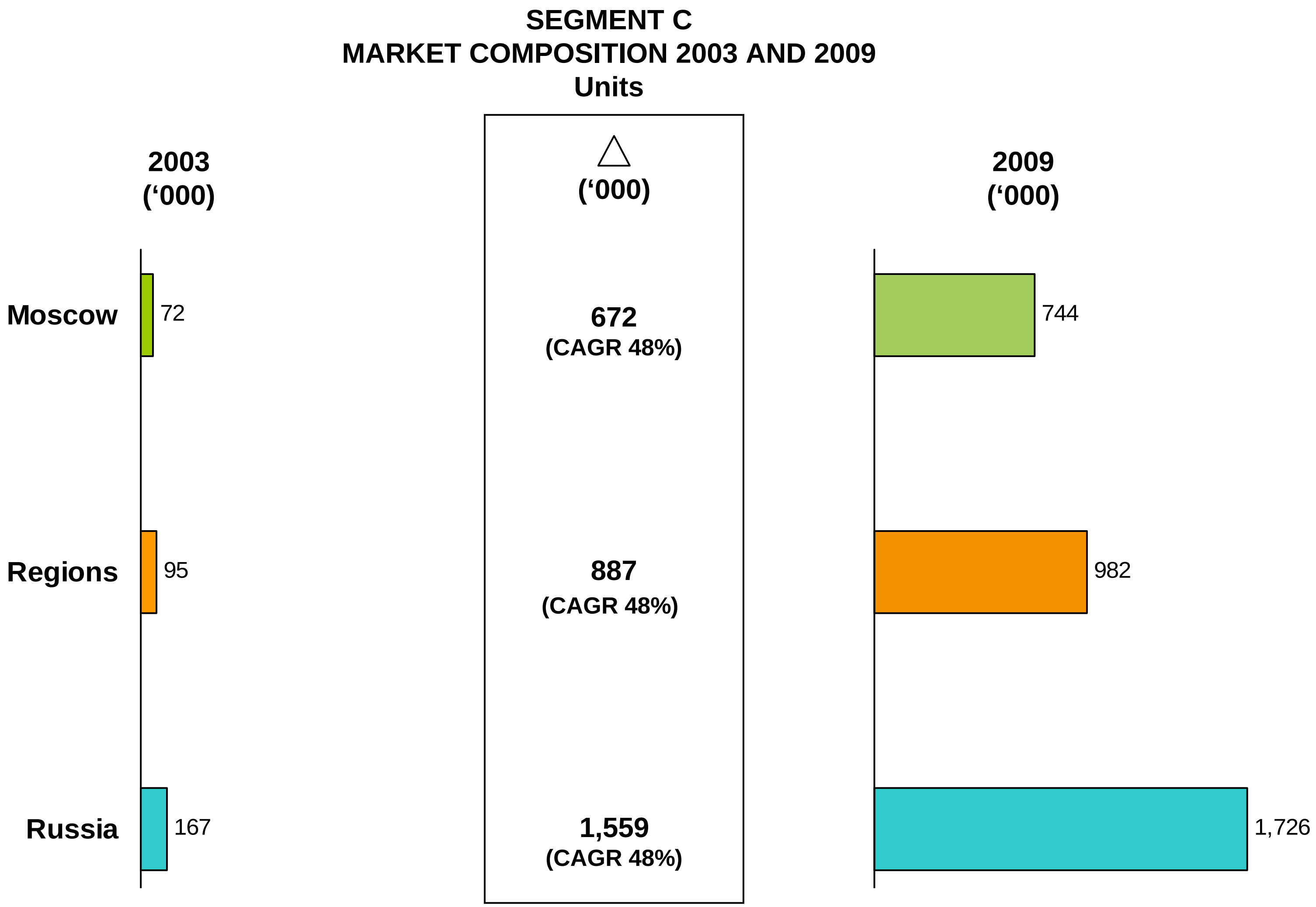
RUSSIA UNIT GROWTH
Segment C
2003-2009



	'03	'04E	'05F	'06F	'07F	'08F	'09F
Units	167	328	480	699	995	1,360	1,726
Annual growth		97%	46%	46%	42%	37%	27%

Source: Canback Dangel analysis

Again, the regions count for a large share of the absolute growth, but Moscow has significant unit potential as well in Segment C

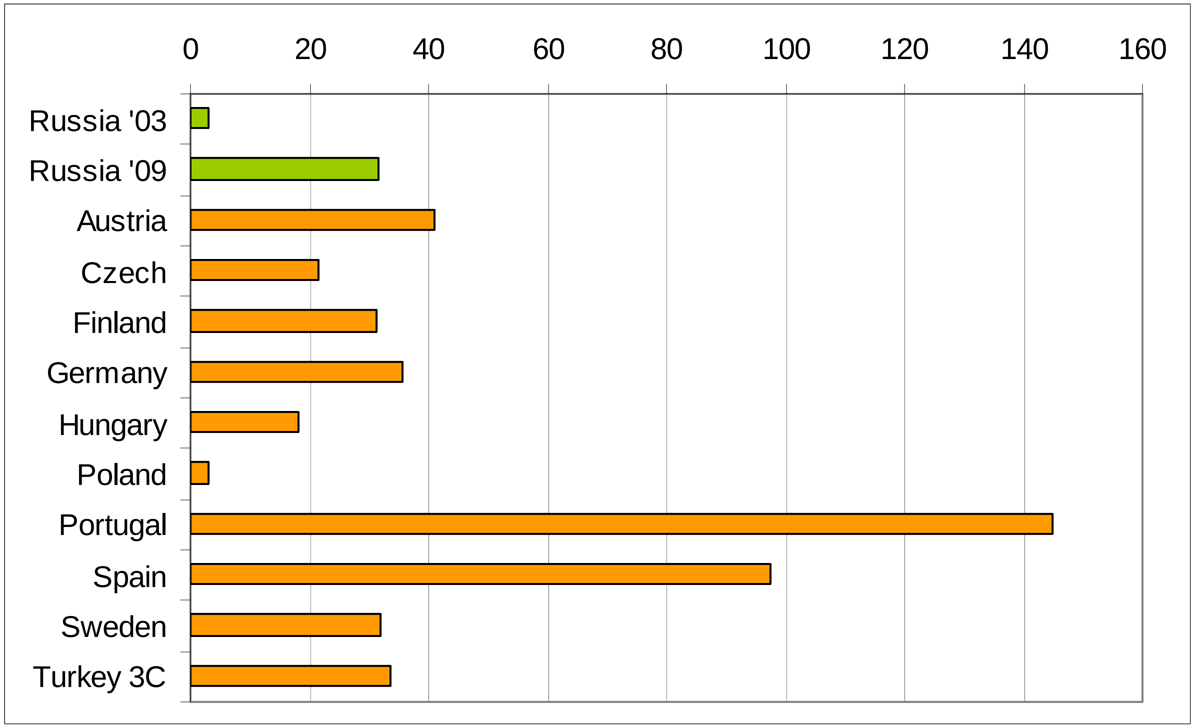


Source: Canback Dangel analysis

A sales intensity analysis indicates that by ’09 the Russian market will achieve levels comparable to those of most countries in the sample

SEGMENT C SALES INTENSITY BY MARKET

Unit sales per household * 1000



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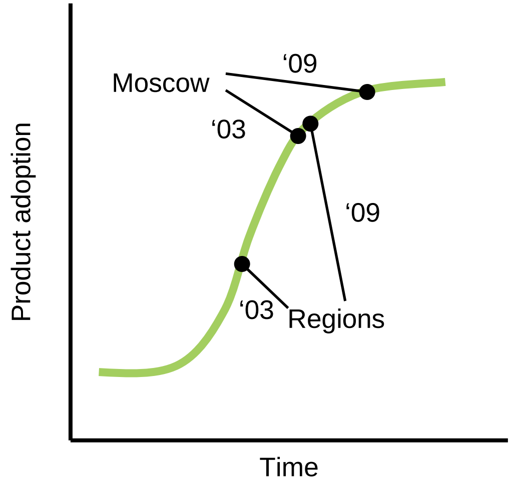
- Russia ’03 is GFK data
- Russia ’09 is based on regression model

Source: GFK, Canback Dangel analysis

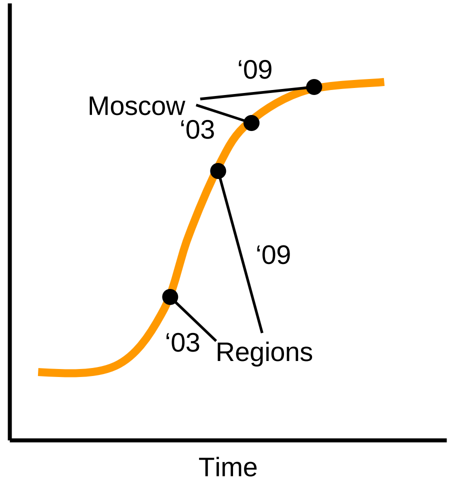
In sum, the prospects differ by segment and region. Segment C is far from maturity, while Segment A is close to maturity in Moscow

SEGMENT A
S-CURVE



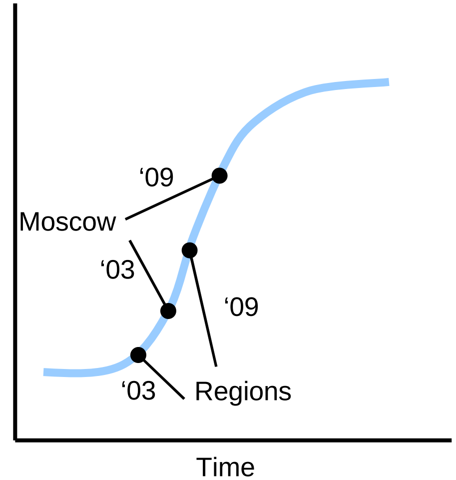
Both Moscow and the regions are becoming fairly highly penetrated. This, puts a damper on future growth. Relative sales levels are high but likely sustainable over the forecast period.

SEGMENT B
S-CURVE



Segment B will reach significant penetration. In addition, relative sales levels are very high, likely leading to a market decline in Moscow even if economic growth continues.

SSEGMENT C
S-CURVE

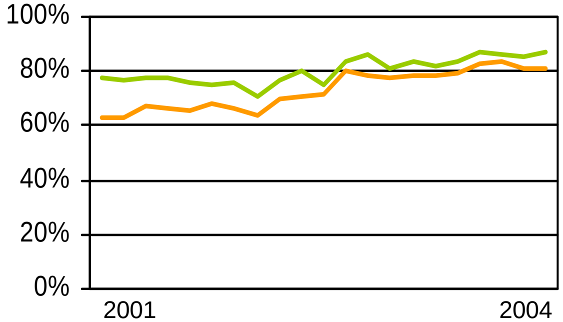


Segment C is far from the saturation point and growth will be very high. However, Segment C is highly sensitive to changes in the overall retail climate and can fall quickly if there is a sudden negative shock. Relative sales levels are quite sustainable.

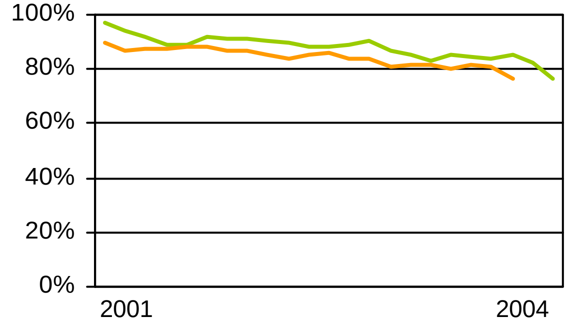
Global brands have done well in Russia with high market shares and price points

SEGMENT A	SEGMENT B	SEGMENT C

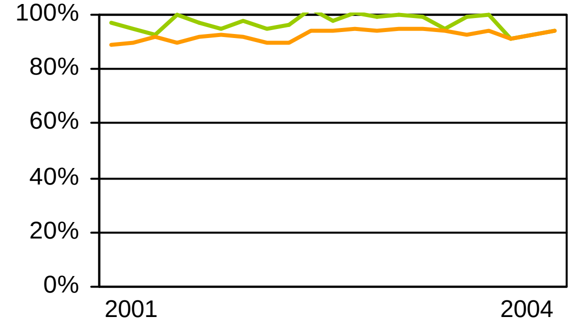
Global brands' market share



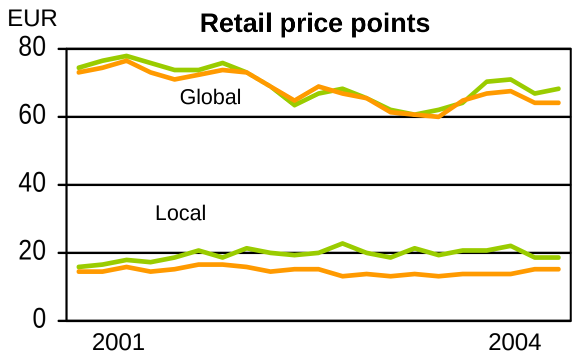
Global brands' market share



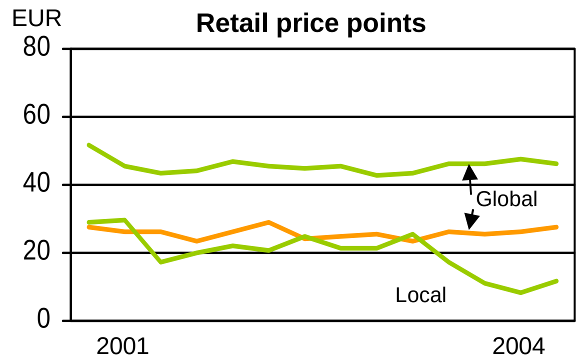
Global brands' market share



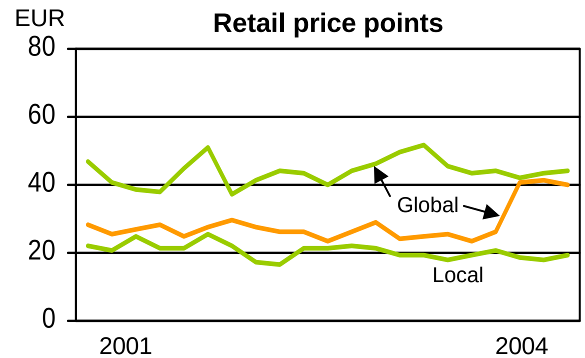
Retail price points



Retail price points



Retail price points



Global brands are steadily gaining share with a price point 4x above local brands

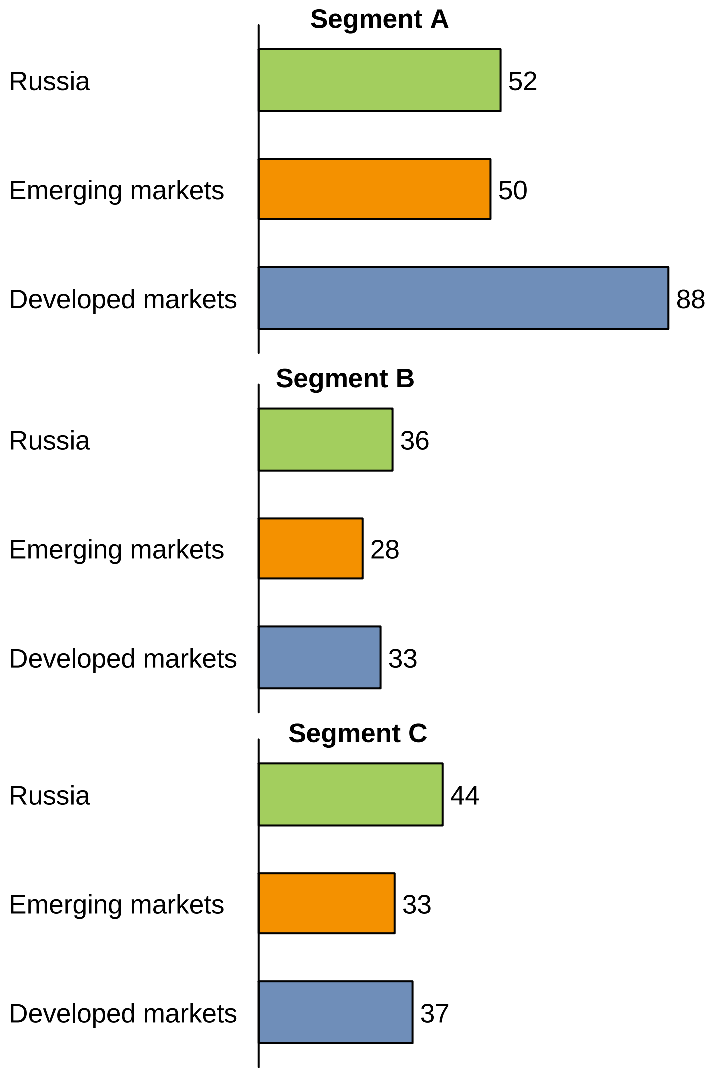
Global brands are losing share but still have around 80% o the market. Less price premium for quality.

Segment continues to be totally dominated by global brands.

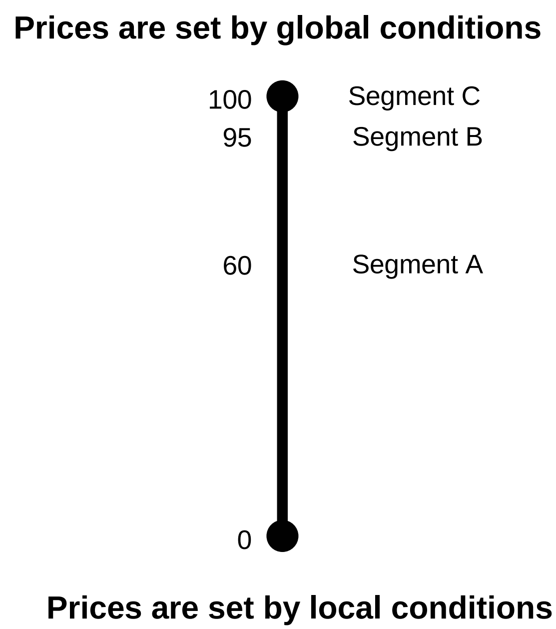
Source: XCo, GFK, Canback Dangel analysis

Average market prices are reasonably high compared to the comparison markets and are mainly set by global, rather than local conditions

AVERAGE MARKET PRICE FOR ALL BRANDS
2003, EUR

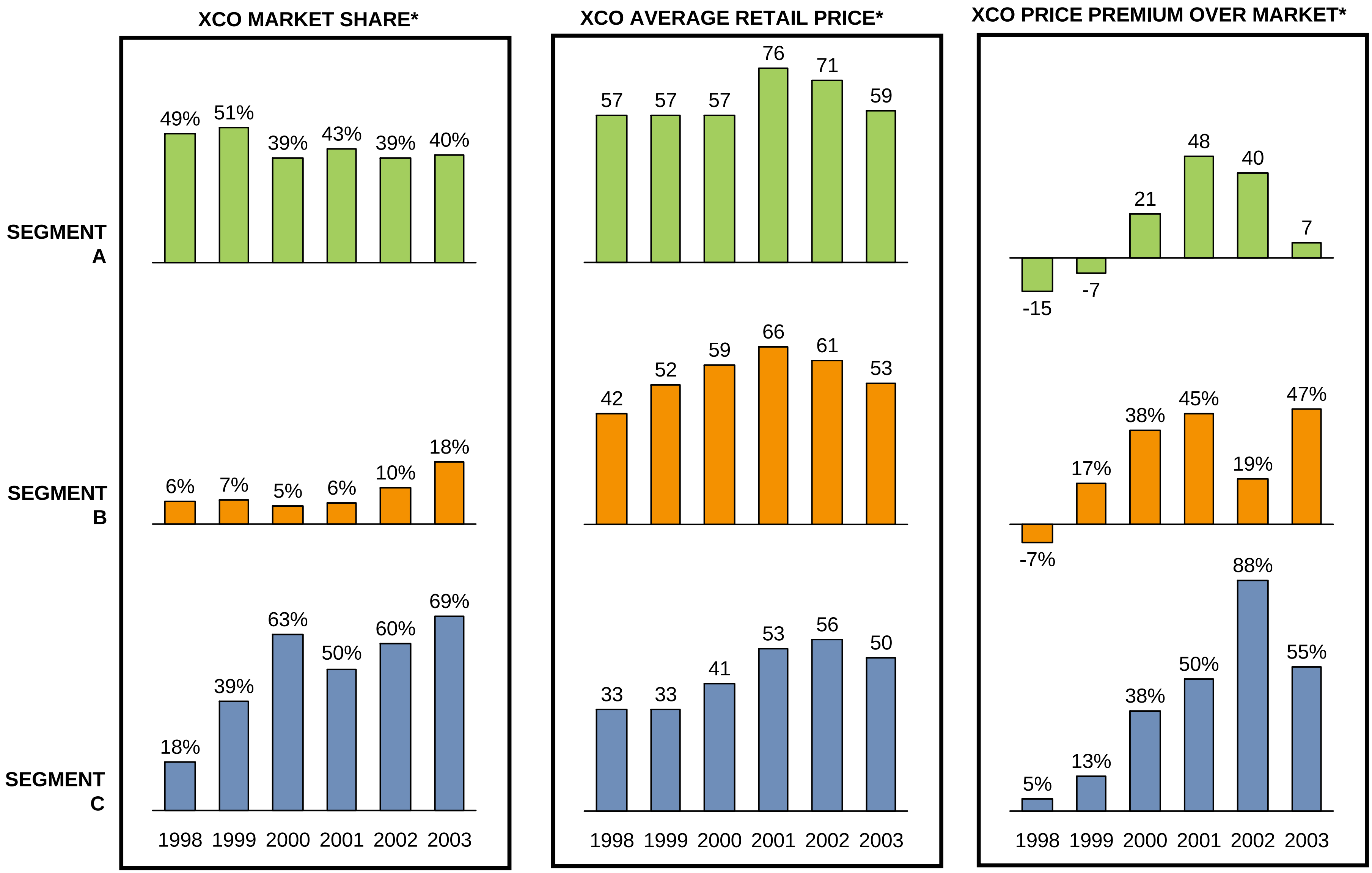


PRICE DETERMINANTS*
2003



* Based on a correlation analysis
Source: GFK, Canback Dangel analysis

XCo has maintained or increased market share and average retail prices over the last few years, has increased its price premium over the market for Segment B and Segment C, but Segment A appear to be under pressure



* Moscow market
Source: GFK, Canback Dangel analysis

XCo should continue to invest in the attractive Russian market with a focus on the regions. The Moscow market is nearing steady-state growth

Russia will continue to represent an important opportunity for XCo:

• The Russian economy will continue to exhibit high growth with excellent economic fundamentals in the medium term, but poor demographics will dampen long-term prospects

• The Russian small appliance markets within Segment A, Segment B, and Segment C are poised to grow at 8-46 percent per year over the several years, depending on segment

• Distribution reach is a prerequisite to success with consumer markets expanding beyond Moscow

Distribution reach is a prerequisite to success with consumer markets expanding in and beyond Moscow

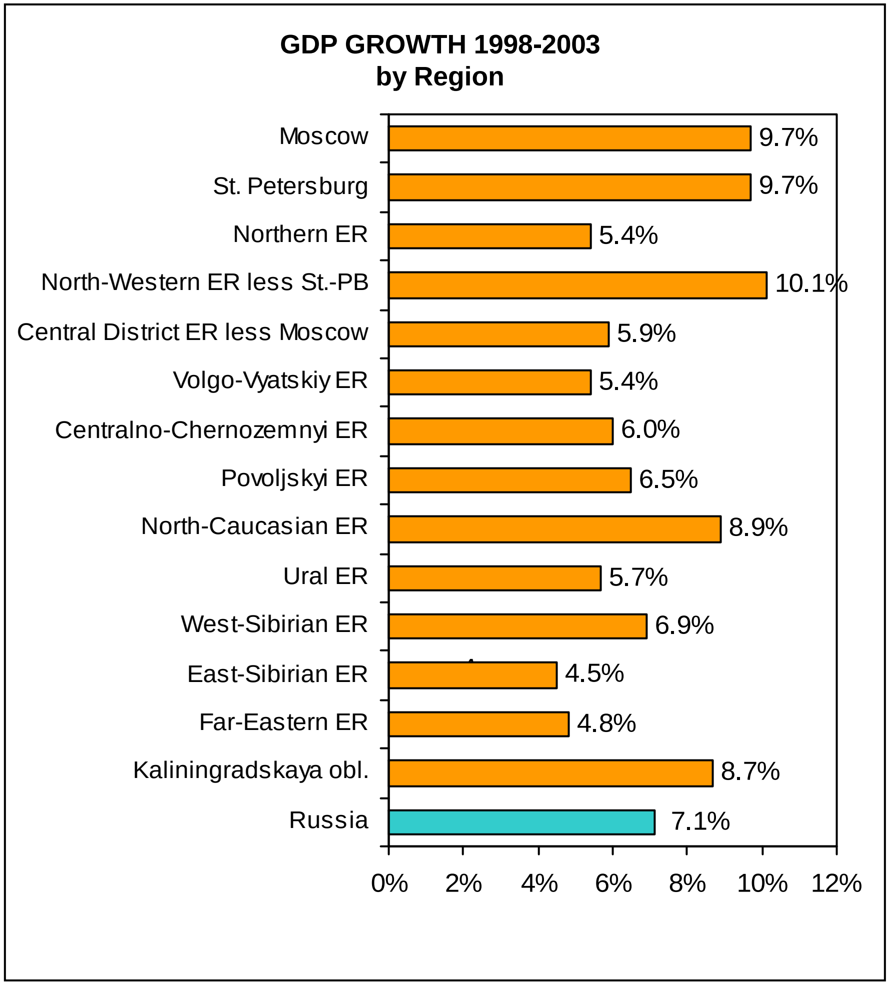
• Moscow has experienced spectacular growth over the last few years and has by far the highest standard of living in Russia. It dominates retailing with 27% of the national market

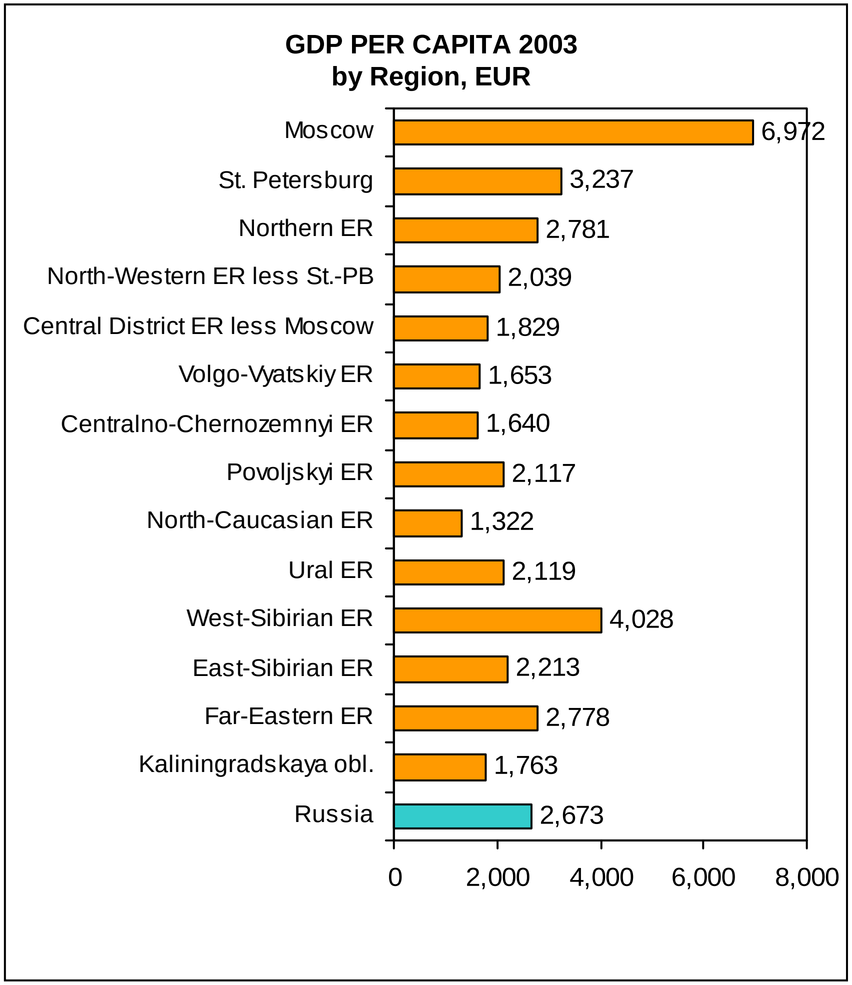
• Moscow will likely grow slightly slower than the regions over the next few years. Despite this, it will continue to be important for retail sales of Western-style goods catering to a rapidly growing middle class

• The regions, however, will make up the lion's share of the growth opportunity. The growth will be somewhat concentrated in the Russian Heartland, which will account for at around 50-60% of total growth

• Because of the lack of modern retailers outside Moscow, the low share of national chains, and the geographic dispersion of population centers, distribution power will be critical to success

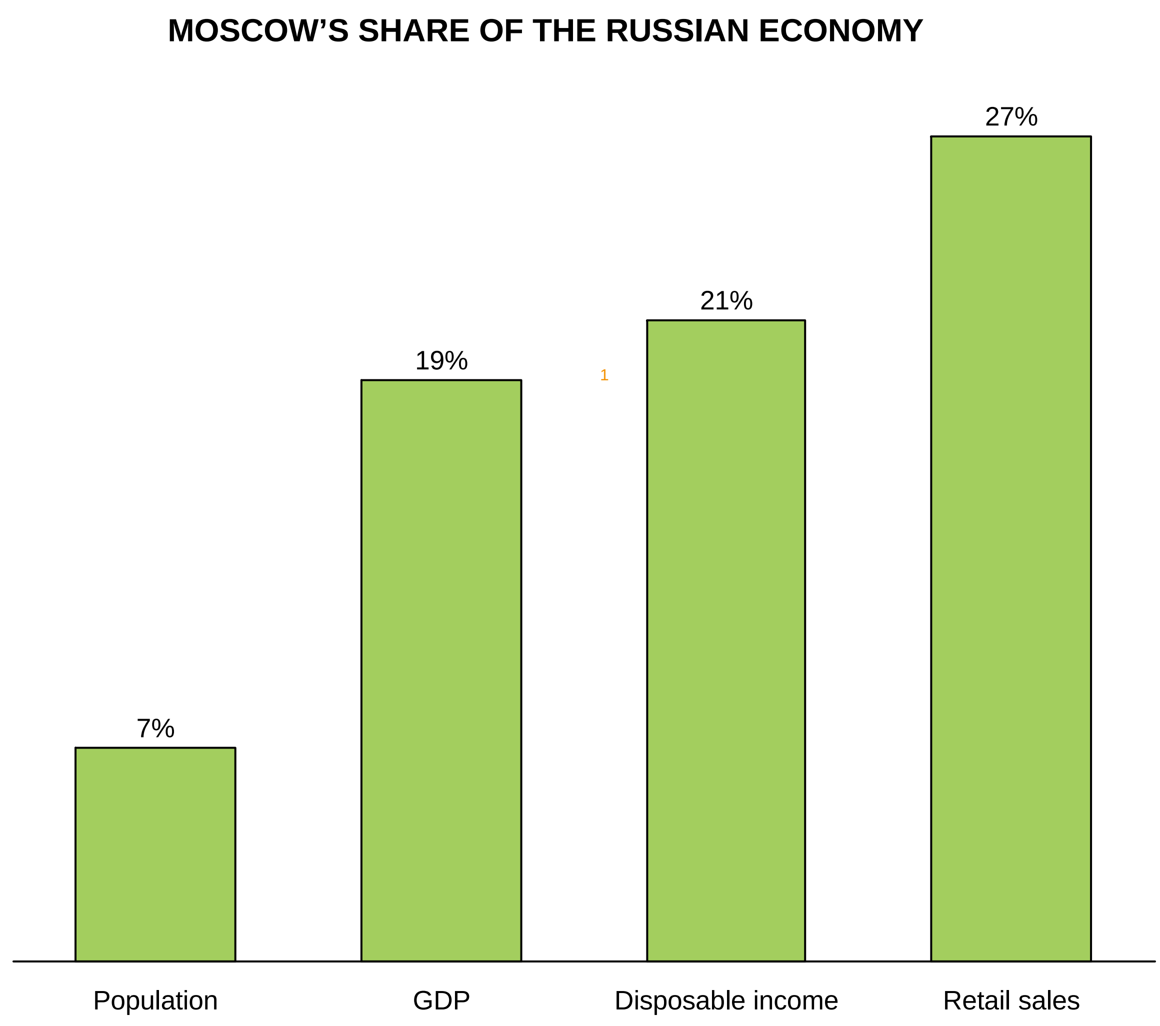
Moscow has outperformed the rest of Russia over the last several years





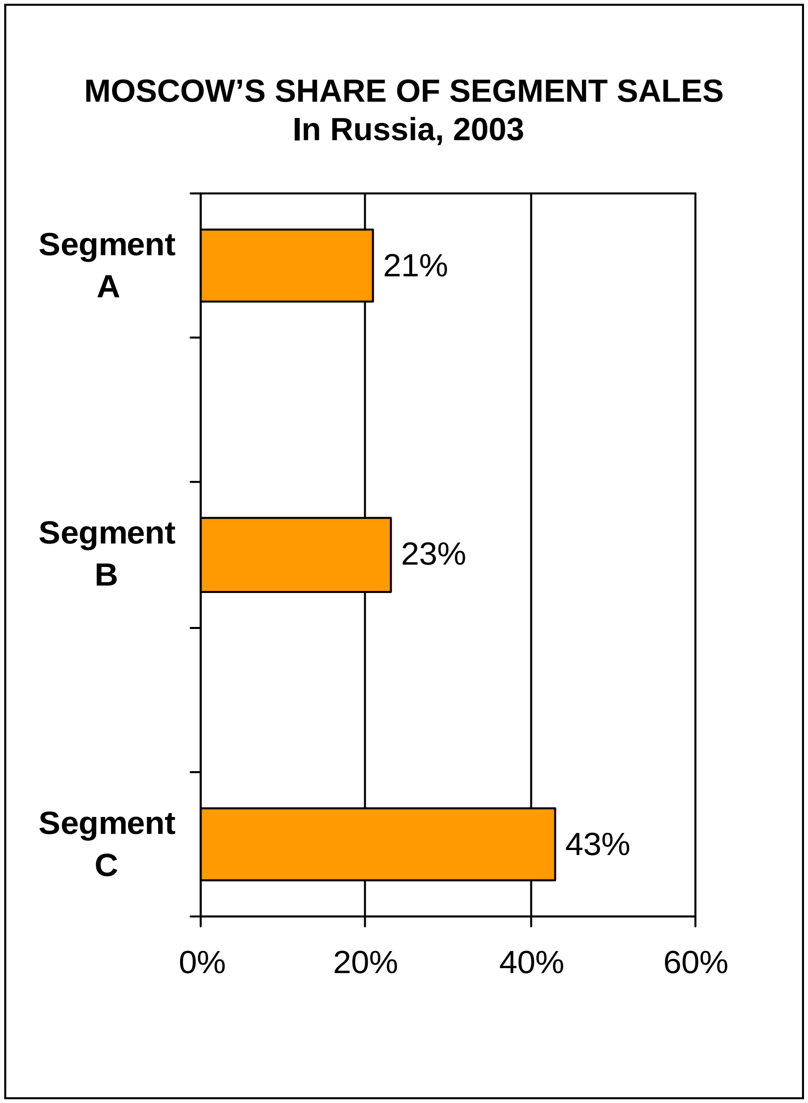
Source: Goskomstat, Canback Dangel analysis

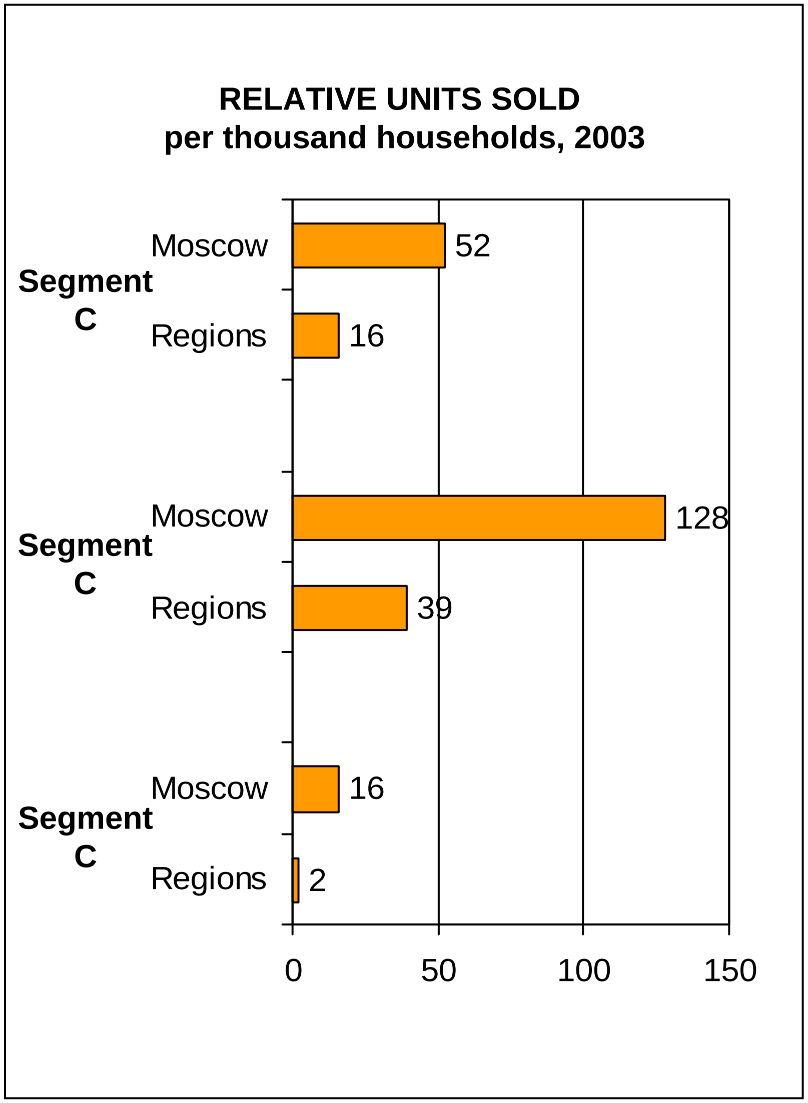
Today, Moscow represents a formidable share of disposable income and retail turnover



Source: Goskomstat

The 3 segments are no exceptions, Moscow represents a similar share of category sales





Source: GFK, XCo, Canback Dangel analysis

This is in part* because there are relatively few households outside Moscow with a sufficient disposable income to buy products within the 3 categories

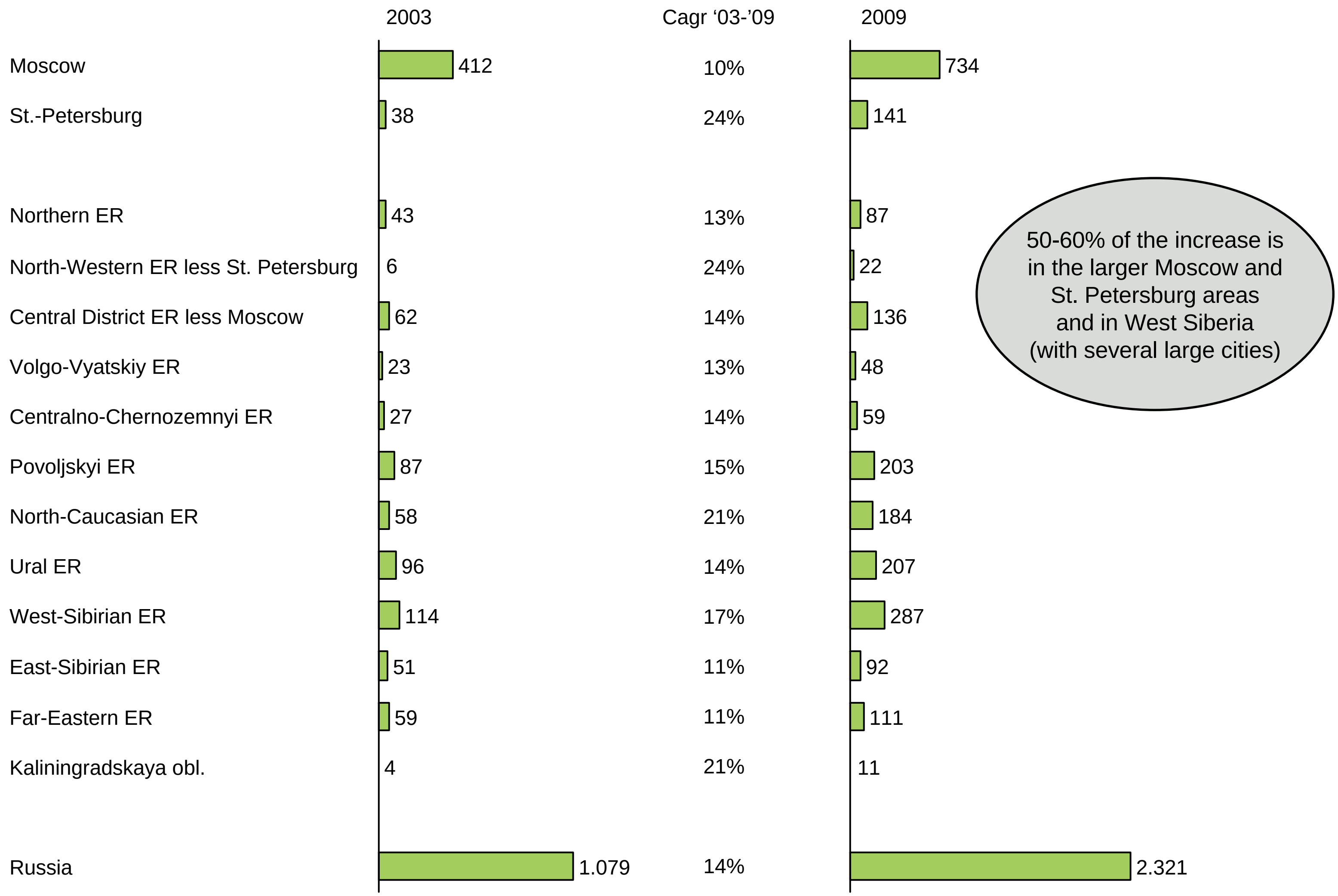
REGIONAL SHARE OF HOUSEHOLDS AT VARIOUS INCOME LEVELS

	All households: No. of HHs in '000	All households: Share of Russia	Households with income >EUR 12,000: Share of Russia	Households with income >EUR 24,000: Share of Russia
Moscow	4,364	8%	23%	38%
St. Petersburg	1,914	4%	4%	4%
Northern ER	2,068	4%	5%	4%
North-Western ER less St.-Petersburg	1,154	2%	1%	1%
Central District ER less Moscow	6,767	13%	7%	6%
Volgo-Vyatskiy ER	3,000	6%	3%	2%
Centralno-Chernozemnyi ER	2,818	5%	3%	2%
Povoljskyi ER	6,100	11%	11%	8%
North-Caucasian ER	6,439	12%	7%	5%
Ural ER	7,433	14%	12%	9%
West-Sibirian ER	5,492	10%	12%	11%
East-Sibirian ER	3,365	6%	6%	5%
Far-Eastern ER	2,597	5%	6%	5%
Kaliningradskaya obl.	347	1%	0%	0%
Russia total	53,857		4,644 (=8.6% of Russian HHs)	1,079 (=2.0% of Russian HHs)

* The other reason is a lack of distribution outside the largest cities
Source: C-GIDD, Canback Dangel analysis

Up till at least 2009 the growth in reasonably affluent households will be strongest in the regions, and centered in Heartland

NUMBER OF AFFLUENT HOUSEHOLDS
Thousands of HHs with income > EUR 24,000



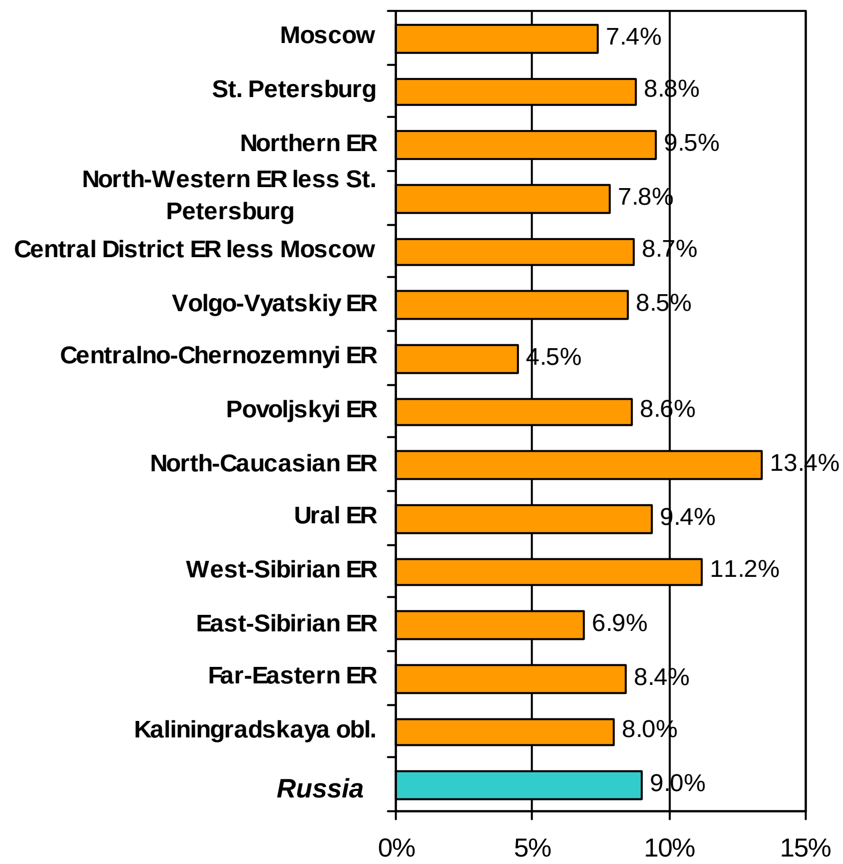
Source: C-GIDD, Canback Dangel analysis

Thus, the retail sector can be expected to grow faster outside Moscow

RETAIL TRADE 2003 AND 2009
by region, billions of 2003 B EUR

	2003	2009
Moscow	35.5	54.4
St. Petersburg	5.0	8.3
Northern ER	5.0	8.5
North-Western ER less St. Petersburg	1.9	2.9
Central District ER less Moscow	12.8	21.1
Volgo-Vyatskiy ER	4.6	7.5
Centralno-Chernozemnyi ER	4.3	5.6
Povoljskyi ER	13.0	26.8
North-Caucasian ER	12.6	24.9
Ural ER	14.2	24.3
West-Sibirian ER	16.3	30.7
East-Sibirian ER	6.2	9.2
Far-Eastern ER	5.6	9.1
Kaliningradskaya obl.	0.6	1.0
Russia	*137.0*	*230.6*

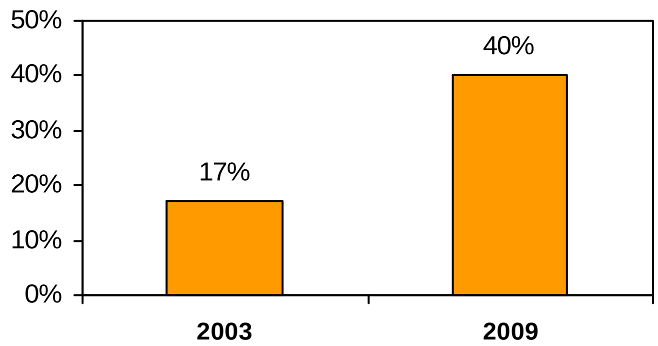
ANNUAL GROWTH IN RETAIL TRADE 2003-09
by region



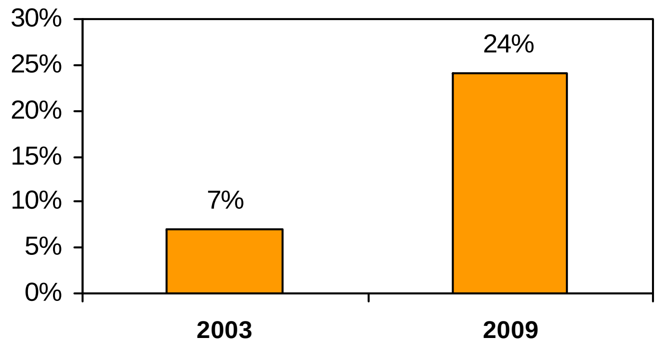
Note: Constant values
Source: Goskomstat, IRG, Canback Dangel analysis

As a result, modern retailers are expanding quickly in regional cities

MODERN RETAILERS IN MOSCOW
% of market turnover



MODERN RETAILERS IN THE REGIONS
% of market turnover



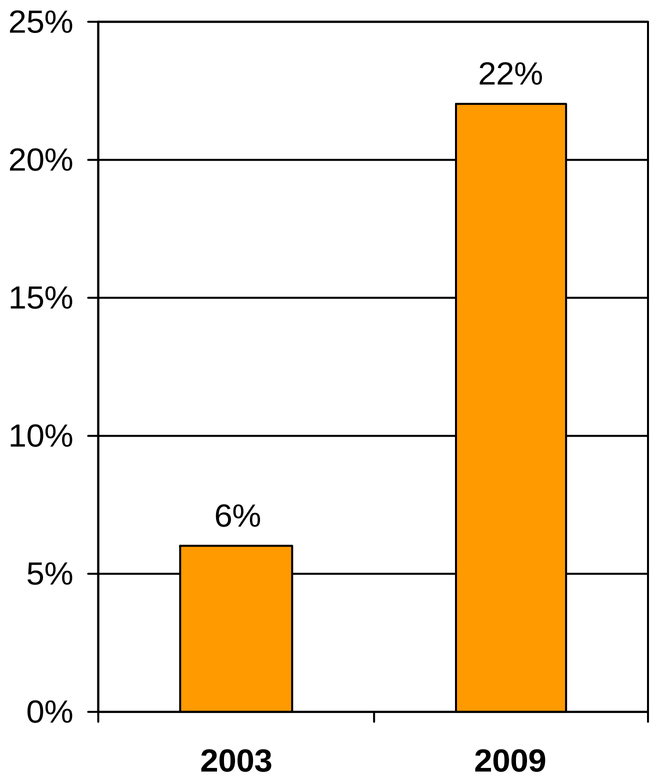
EXAMPLES OF REGIONAL EXPANSION, 2004

Retail Chain	Market
Ramstore	Kazan Samara Kaliningrad Tolyatti
Paterson	Kazan Yoshker-Ola Nizhni Novgorod Sochi
Perekrostok	Semera Tolyatti S:t Petersburg Volgograd
5 Nimeroska	Ekaterinburg Volgograd Nizhni Novgorod
Eldorado	470 stores all over Russia. Numerous openings in 2004

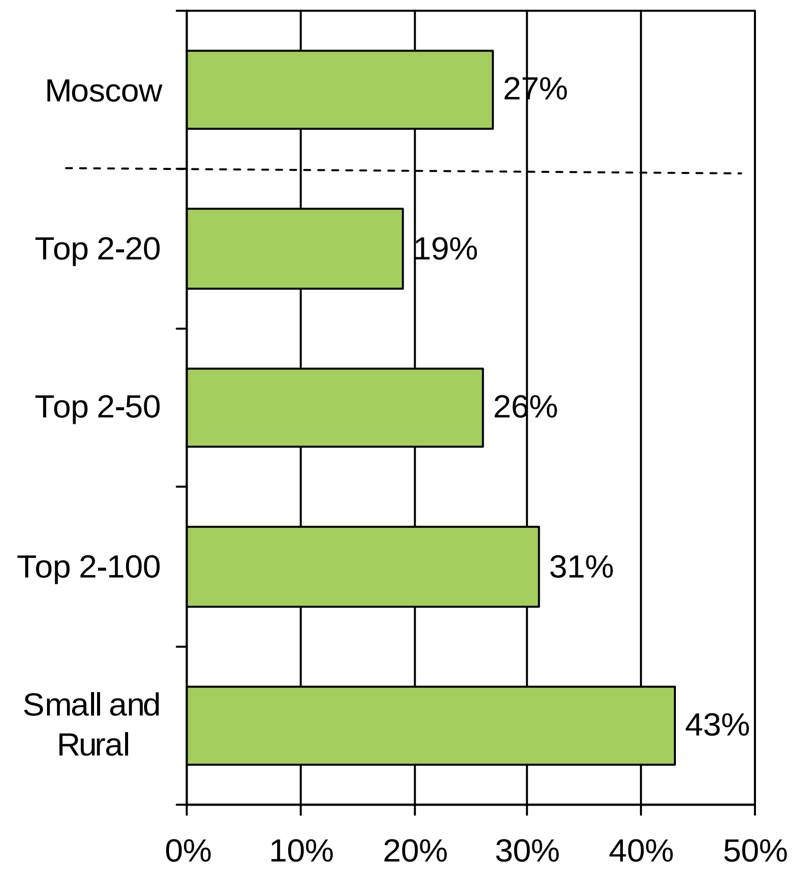
Source: IRG, Canback Dangel analysis

Good distributors will be critical to success since national chains still are in their infancy

NATIONAL RETAILERS AS SHARE OF TOTAL RETAILING



MARKET FRAGMENTATION
Cities' share of regional retail market



Source: IRG, Canback Dangel analysis

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