stock_analysis

November 16, 2025

1 Price Behavior Around Dividend Events: Norwegian Energy Stocks

1.1 Abstract

This analysis examines price behavior around 62 dividend events across three Norwegian energy stocks (Equinor, Aker BP, Vår Energi) over a 5-year period (2020-2025). The study identifies distinct price patterns relative to ex-dividend and payment dates, with each stock exhibiting unique behavioral characteristics that suggest optimal entry timing varies by security.

1.2 Methodology

Dataset: Historical daily closing prices and dividend events from Yahoo Finance
Period: January 2020 - November 2025
Analysis Window: ±80 trading days around ex-dividend dates
Normalization: Prices indexed to 0% at ex-dividend date for cross-event comparison
Sample Size: Equinor (24 events), Aker BP (24 events), Vår Energi (14 events)

1.3 Investment Scenarios

This analysis addresses four common portfolio management situations:

1. **Dividend Reinvestment**: Redeploying cash received from dividend payouts
2. **Portfolio Rebalancing**: Repositioning across multiple holdings
3. **Loss Mitigation**: Reinvesting proceeds from forced liquidations
4. **New Capital Deployment**: Initial position entry timing

Timing analysis suggests entry point selection can impact short-term returns by 3-10% based on position relative to ex-dividend date.

1.4 Findings by Security

1.4.1 Equinor (EQNR.OL)

Observed Pattern: Price decline prior to ex-date, suppression through payout period, recovery post-payout

Quantitative Summary: - Trough: Day -53 (-3.86% relative to ex-date price) - Peak: Day +51 (+6.89% relative to ex-date price) - Week after ex-date: +0.65% average - Full cycle range: 10.7%

Entry Analysis: - Favorable window: Days 0 to +21 (ex-date through estimated payout) - Unfavorable: Days -30 to -1 (pre-ex elevation period) - Optimal: Days 0 to +10

1.4.2 Aker BP (AKRBP.OL)

Observed Pattern: Pre-ex decline followed by continued post-ex deterioration

Quantitative Summary: - Trough: Day -51 (-10.19% relative to ex-date price) - Peak: Day +79 (+7.76% relative to ex-date price) - Week before ex-date: -0.43% average - Week after ex-date: +1.16% average - Full cycle range: 17.9%

Entry Analysis: - Favorable window: Days -7 to 0 (week prior to ex-date) - Unfavorable: Days +1 to +30 (post-ex decline period) - Optimal: Days -5 to 0

1.4.3 Vår Energi (VAR.OL)

Observed Pattern: Similar to Aker BP but with higher volatility; limited sample size

Quantitative Summary: - Trough: Day -37 (-6.10% relative to ex-date price) - Week before ex-date: -1.06% average - Week after ex-date: +0.39% average - Sample limitation: 14 events since February 2022 IPO

Entry Analysis: - Favorable window: Days -7 to 0 - Unfavorable: Days +1 to +30 - Optimal: Days -5 to 0

1.5 Summary

Equinor - Optimal Entry Window: Days 0 to +21 - Rationale: Post-ex suppression followed by recovery - Periods to Avoid: Days -30 to -1

Aker BP - Optimal Entry Window: Days -7 to 0 - Rationale: Captures pre-ex dip, avoids post-ex decline - Periods to Avoid: Days +1 to +30

Vår Energi - Optimal Entry Window: Days -7 to 0 - Rationale: Follows Aker BP pattern - Periods to Avoid: Days +1 to +30

1.6 Data Visualization

The following sections present: 1. Historical price charts with dividend event markers 2. Overlaid dividend cycle analysis (transparency indicates event chronology) 3. Average behavior across all events (±80 day window) 4. Focused analysis (±30 day window)

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2 Data & Analysis

Stocks: Equinor (EQNR.OL), Vår Energi (VAR.OL), Aker BP (AKRBP.OL)
Period: 2020-01-01 to present
Total Events: 62 dividend cycles analyzed

2.1 Data Loading

[1]:

```
# Import required libraries
import yfinance as yf
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
from datetime import datetime, timedelta

# Set plotting style
plt.style.use('seaborn-v0_8-darkgrid')
%matplotlib inline
```

[2]:

```
# Define the stocks and date range
stocks = {
    'Equinor': 'EQNR.OL',
    'Vår Energi': 'VAR.OL',
    'Aker BP': 'AKRBP.OL'
}

start_date = '2020-01-01'
end_date = datetime.now().strftime('%Y-%m-%d')

print(f"Analysis period: {start_date} to {end_date}")
print(f"Stocks: {', '.join(stocks.keys())}\\n")
```

```
Analysis period: 2020-01-01 to 2025-11-16
Stocks: Equinor, Vår Energi, Aker BP\n
```

2.1.1 a. Stock Price Data

[3]:

```
# Fetch stock price data
stock_data = {}
ticker_objects = {}

for name, ticker in stocks.items():
    print(f"Fetching {name} ({ticker})...")
    ticker_obj = yf.Ticker(ticker)
    ticker_objects[name] = ticker_obj

    hist = ticker_obj.history(start=start_date, end=end_date)
    stock_data[name] = hist
    print(f"  {len(hist)} trading days from {hist.index[0].
↪strftime('%Y-%m-%d')} to {hist.index[-1].strftime('%Y-%m-%d')}")

print(f"\nData loaded.")
```

```
Fetching Equinor (EQNR.OL)…
  1479 trading days from 2020-01-02 to 2025-11-14
Fetching Vår Energi (VAR.OL)…
  943 trading days from 2022-02-16 to 2025-11-14
Fetching Aker BP (AKRBP.OL)…
  1479 trading days from 2020-01-02 to 2025-11-14

Data loaded.
```

2.1.2 b. Dividend Dates and Amounts

[4]:

```
# Fetch dividend information (ex-dividend dates)
dividend_info = {}

print("Ex-Dividend Dates and Amounts:\n")
print("="*80)

for name, ticker_obj in ticker_objects.items():
    dividends = ticker_obj.dividends
    dividends = dividends[dividends.index >= start_date]

    dividend_info[name] = dividends

    print(f"\n{name}:")
    if len(dividends) > 0:
        print(f"  Total events: {len(dividends)}")
        print(f"\n  Date        | Amount (NOK)")
        print(f"  {'-'*11}|{'-'*13}")
        for div_date, div_amount in dividends.items():
            print(f"  {div_date.strftime('%Y-%m-%d')} | {div_amount:>10.2f}")
    else:
        print(f"  No dividend data available")

print(f"\n{'='*80}")
```

```
Ex-Dividend Dates and Amounts:

================================================================================

Equinor:
  Total events: 24
  Date       | Amount (NOK)
  -----------|-------------
  2020-02-18 |       2.41
  2020-05-15 |       2.72
  2020-08-14 |       0.80
  2020-11-12 |       0.82
  2021-02-11 |       0.93
  2021-05-12 |       0.99
  2021-08-11 |       1.33
  2021-11-11 |       1.81
  2022-02-11 |       1.81
  2022-05-12 |       3.91
  2022-08-11 |       3.86
  2022-11-11 |       7.07
  2023-01-09 |       9.05
  2023-05-11 |       9.05
  2023-08-14 |       9.05
  2023-11-14 |       9.85
  2024-02-14 |       9.47
  2024-05-15 |       7.51
  2024-08-16 |       7.43
  2024-11-18 |       7.75
  2025-02-13 |       7.83
  2025-05-15 |       3.82
  2025-08-18 |       3.77
  2025-11-13 |       3.72

Vår Energi:
  Total events: 14

  Date       | Amount (NOK)
  -----------|-------------
  2022-05-05 |       0.83
  2022-08-04 |       1.02
  2022-11-02 |       1.23
  2023-02-24 |       1.23
  2023-05-03 |       1.15
  2023-08-04 |       1.09
  2023-11-03 |       1.20
  2024-02-19 |       1.14
  2024-04-29 |       1.19
  2024-07-29 |       1.18
  2024-10-28 |       1.18
  2025-02-17 |       1.21
  2025-04-29 |       1.25
  2025-08-18 |       1.22

Aker BP:
```

```
Total events: 24

Date       | Amount (NOK)
-----------|-------------
2020-02-13 |       5.45
2020-05-08 |       2.03
2020-07-31 |       1.85
2020-11-02 |       1.84
2021-02-10 |       2.69
2021-05-03 |       2.59
2021-07-20 |       2.73
2021-11-02 |       3.49
2022-02-15 |       4.18
2022-05-03 |       4.39
2022-08-16 |       5.21
2022-10-31 |       5.53
2023-02-15 |       5.57
2023-05-03 |       5.84
2023-07-18 |       5.66
2023-11-01 |       6.19
2024-02-13 |       6.34
2024-04-29 |       6.59
2024-07-17 |       6.46
2024-11-04 |       6.59
2025-02-17 |       7.06
2025-05-12 |       6.52
2025-07-18 |       6.36
2025-10-27 |       6.33

================================================================================
```

2.1.3 c. Payment Dates (Estimated)

Note: Yahoo Finance doesn't provide payment dates. Typically, dividends are paid 2-4 weeks after the ex-dividend date.

[5]:

```
# Estimate payment dates (typically 2-3 weeks after ex-date for Norwegian␣
↪stocks)
payment_info = {}

print("Estimated Payment Dates:\n")
print("="*80)

for name, dividends in dividend_info.items():
    payments = {}
    print(f"\n{name}:")

    if len(dividends) > 0:
        print(f"  Ex-Date    | Est. Payment (~3 weeks) | Amount (NOK)")
        print(f"  {'-'*11}|{'-'*25}|{'-'*13}")

        for div_date, div_amount in dividends.items():
            # Estimate payment date as 21 days after ex-date
            est_payment = div_date + pd.Timedelta(days=21)
            payments[div_date] = est_payment
            print(f"  {div_date.strftime('%Y-%m-%d')} | {est_payment.
↪strftime('%Y-%m-%d')}              | {div_amount:>10.2f}")
    else:
        print(f"  No dividend data available")

    payment_info[name] = payments

print(f"\n{'='*80}")
print("Note: Payment dates are estimated. Actual dates may vary by ±1 week.")
```

```
Estimated Payment Dates:

================================================================================

Equinor:
  Ex-Date    | Est. Payment (~3 weeks) | Amount (NOK)
  -----------|-------------------------|-------------
  2020-02-18 | 2020-03-10              |       2.41
  2020-05-15 | 2020-06-05              |       2.72
  2020-08-14 | 2020-09-04              |       0.80
  2020-11-12 | 2020-12-03              |       0.82
  2021-02-11 | 2021-03-04              |       0.93
  2021-05-12 | 2021-06-02              |       0.99
  2021-08-11 | 2021-09-01              |       1.33
  2021-11-11 | 2021-12-02              |       1.81
  2022-02-11 | 2022-03-04              |       1.81
  2022-05-12 | 2022-06-02              |       3.91
  2022-08-11 | 2022-09-01              |       3.86
  2022-11-11 | 2022-12-02              |       7.07
  2023-01-09 | 2023-01-30              |       9.05
  2023-05-11 | 2023-06-01              |       9.05
  2023-08-14 | 2023-09-04              |       9.05
  2023-11-14 | 2023-12-05              |       9.85
  2024-02-14 | 2024-03-06              |       9.47
  2024-05-15 | 2024-06-05              |       7.51
  2024-08-16 | 2024-09-06              |       7.43
  2024-11-18 | 2024-12-09              |       7.75
  2025-02-13 | 2025-03-06              |       7.83
  2025-05-15 | 2025-06-05              |       3.82
  2025-08-18 | 2025-09-08              |       3.77
  2025-11-13 | 2025-12-04              |       3.72
```

```
Vår Energi:
  Ex-Date    | Est. Payment (~3 weeks) | Amount (NOK)
  -----------|-------------------------|-------------
  2022-05-05 | 2022-05-26              |       0.83
  2022-08-04 | 2022-08-25              |       1.02
  2022-11-02 | 2022-11-23              |       1.23
  2023-02-24 | 2023-03-17              |       1.23
  2023-05-03 | 2023-05-24              |       1.15
  2023-08-04 | 2023-08-25              |       1.09
  2023-11-03 | 2023-11-24              |       1.20
  2024-02-19 | 2024-03-11              |       1.14
  2024-04-29 | 2024-05-20              |       1.19
  2024-07-29 | 2024-08-19              |       1.18
  2024-10-28 | 2024-11-18              |       1.18
  2025-02-17 | 2025-03-10              |       1.21
  2025-04-29 | 2025-05-20              |       1.25
  2025-08-18 | 2025-09-08              |       1.22

Aker BP:
  Ex-Date    | Est. Payment (~3 weeks) | Amount (NOK)
  -----------|-------------------------|-------------
  2020-02-13 | 2020-03-05              |       5.45
  2020-05-08 | 2020-05-29              |       2.03
  2020-07-31 | 2020-08-21              |       1.85
  2020-11-02 | 2020-11-23              |       1.84
  2021-02-10 | 2021-03-03              |       2.69
  2021-05-03 | 2021-05-24              |       2.59
  2021-07-20 | 2021-08-10              |       2.73
  2021-11-02 | 2021-11-23              |       3.49
  2022-02-15 | 2022-03-08              |       4.18
  2022-05-03 | 2022-05-24              |       4.39
  2022-08-16 | 2022-09-06              |       5.21
  2022-10-31 | 2022-11-21              |       5.53
  2023-02-15 | 2023-03-08              |       5.57
  2023-05-03 | 2023-05-24              |       5.84
  2023-07-18 | 2023-08-08              |       5.66
  2023-11-01 | 2023-11-22              |       6.19
  2024-02-13 | 2024-03-05              |       6.34
  2024-04-29 | 2024-05-20              |       6.59
  2024-07-17 | 2024-08-07              |       6.46
  2024-11-04 | 2024-11-25              |       6.59
  2025-02-17 | 2025-03-10              |       7.06
  2025-05-12 | 2025-06-02              |       6.52
  2025-07-18 | 2025-08-08              |       6.36
  2025-10-27 | 2025-11-17              |       6.33

================================================================================
Note: Payment dates are estimated. Actual dates may vary by ±1 week.
```

2.2 Visualization

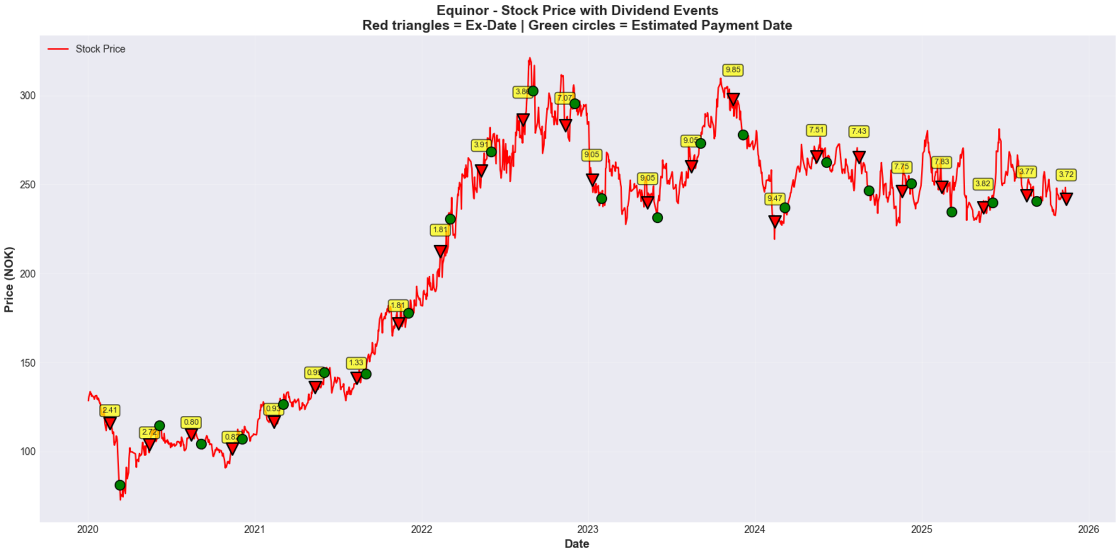
Stock price charts with dividend events marked

[6]:

```
# Color scheme for consistency
COLORS = {
    'Equinor': 'red',
    'Aker BP': 'purple',
    'Vår Energi': 'darkblue'
}

# Helper function to plot stock with dividend events
def plot_stock_with_dividends(stock_name, color=None):
    """Plot stock price with ex-dividend and payment dates marked"""
    data = stock_data[stock_name]
    dividends = dividend_info[stock_name]
    payments = payment_info[stock_name]

    # Use consistent color scheme
    if color is None:
        color = COLORS.get(stock_name, 'darkblue')

    fig, ax = plt.subplots(figsize=(16, 8))

    # Plot stock price
    ax.plot(data.index, data['Close'], linewidth=1.5, color=color, label='Stock␣
↪Price')

    # Mark ex-dividend dates
    for div_date, div_amount in dividends.items():
        if div_date in data.index:
            price = data.loc[div_date, 'Close']
        else:
            # Find closest trading day
            closest_idx = data.index.get_indexer([div_date],␣
↪method='nearest')[0]
            price = data.iloc[closest_idx]['Close']

        # Ex-date marker
        ax.scatter([div_date], [price], s=150, color='red', zorder=5,␣
↪marker='v',
                  edgecolors='black', linewidth=1.5)
        ax.text(div_date, price * 1.05, f'{div_amount:.2f}', ha='center',␣
↪fontsize=8,
                bbox=dict(boxstyle='round,pad=0.3', facecolor='yellow', alpha=0.
↪7))

        # Payment date marker
        if div_date in payments:
            payment_date = payments[div_date]
            if payment_date <= data.index[-1]:
                if payment_date in data.index:
                    payment_price = data.loc[payment_date, 'Close']
                else:
                    closest_idx = data.index.get_indexer([payment_date],␣
↪method='nearest')[0]
                    payment_price = data.iloc[closest_idx]['Close']

                ax.scatter([payment_date], [payment_price], s=100,␣
↪color='green', zorder=5, marker='o',
                          edgecolors='black', linewidth=1)

    # Styling
    ax.set_xlabel('Date', fontsize=12, fontweight='bold')
    ax.set_ylabel('Price (NOK)', fontsize=12, fontweight='bold')
    ax.set_title(f'{stock_name} - Stock Price with Dividend Events\nRed␣
↪triangles = Ex-Date | Green circles = Estimated Payment Date',
                 fontsize=14, fontweight='bold')
    ax.grid(True, alpha=0.3)
    ax.legend(loc='upper left', fontsize=10)

    plt.tight_layout()
    plt.show()

    print(f"\nChart shows {len(dividends)} dividend events for {stock_name}")
```

2.2.1 a. Equinor

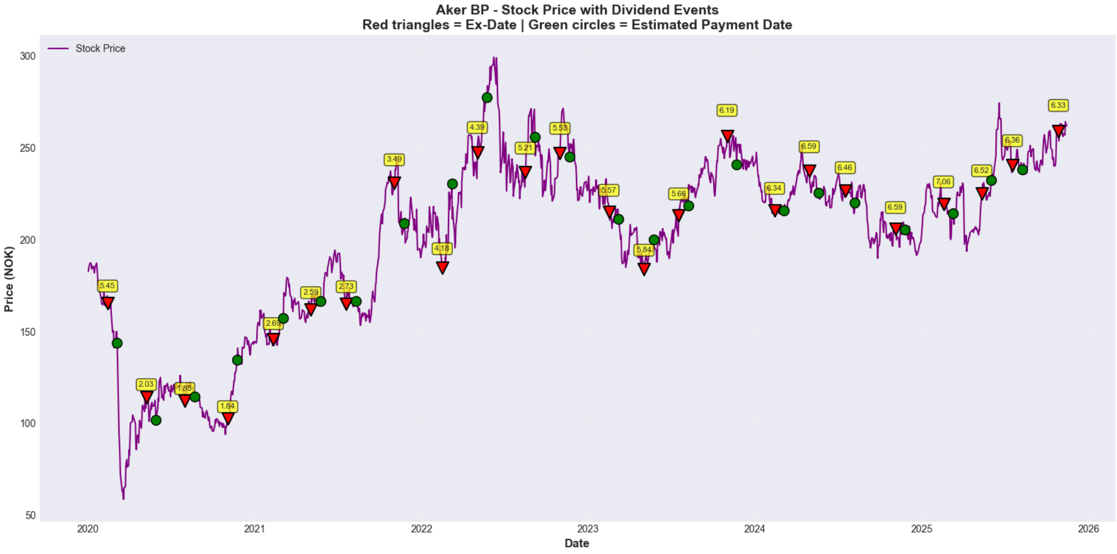
[7]:
```
plot_stock_with_dividends('Equinor')
```



```
Chart shows 24 dividend events for Equinor
```

2.2.2 b. Aker BP

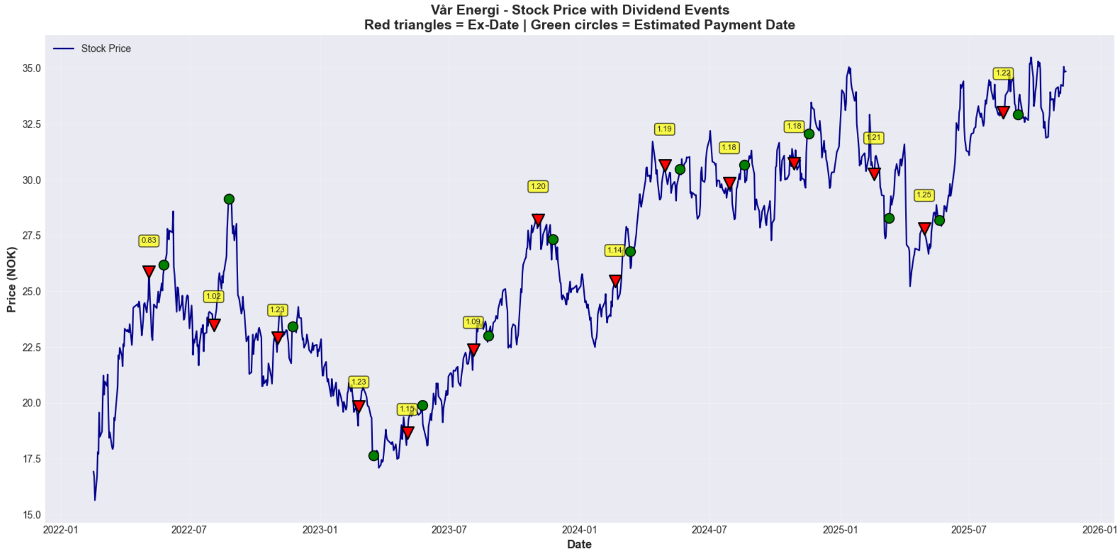
[8]:
```
plot_stock_with_dividends('Aker BP')
```



```
Chart shows 24 dividend events for Aker BP
```

2.2.3 c. Vår Energi

[9]:
```
plot_stock_with_dividends('Vår Energi')
print("\nNote: Vår Energi IPO'd in February 2022, so historical data is␣
 ↪limited")
```



```
Chart shows 14 dividend events for Vår Energi

Note: Vår Energi IPO'd in February 2022, so historical data is limited
```

2.3 Behavior Insights

Analyzing price behavior around dividend events

[10]:
```
# Analyze price behavior ±30 days around ex-dividend dates
# Extract windows around each dividend event

def extract_dividend_windows(stock_name, days_before=30, days_after=30):
    """Extract price data around each dividend event"""
    stock_price = stock_data[stock_name]['Close']
    dividends = dividend_info[stock_name]

    windows = []

    for div_date, div_amount in dividends.items():
        # Get data window
        start_date = div_date - pd.Timedelta(days=days_before + 10)
        end_date = div_date + pd.Timedelta(days=days_after + 10)
        period_data = stock_price[(stock_price.index >= start_date) &␣
 ↪(stock_price.index <= end_date)]

        if len(period_data) > 0:
            # Find ex-dividend date position
            ex_div_idx = period_data.index.get_indexer([div_date],␣
 ↪method='nearest')[0]

            # Extract window
            start_idx = max(0, ex_div_idx - days_before)
            end_idx = min(len(period_data), ex_div_idx + days_after + 1)
            window_data = period_data.iloc[start_idx:end_idx]

            # Create relative day index (0 = ex-dividend date)
            actual_ex_div_date = period_data.index[ex_div_idx]
            relative_days = [(d - actual_ex_div_date).days for d in window_data.
 ↪index]

            # Normalize to percentage change from ex-dividend price
            ex_div_price = window_data.iloc[ex_div_idx - start_idx]
            normalized_prices = ((window_data - ex_div_price) / ex_div_price) *␣
 ↪100

            windows.append({
                'date': div_date,
                'year': div_date.year,
                'amount': div_amount,
                'relative_days': relative_days,
                'normalized_prices': normalized_prices.values
            })

    return windows

print("Extracting dividend windows for all stocks (±80 days)...")
all_windows = {}
for stock_name in stocks.keys():
    windows = extract_dividend_windows(stock_name, days_before=80,␣
 ↪days_after=80)
    all_windows[stock_name] = windows
    print(f"  {stock_name}: {len(windows)} events")
```

```
Extracting dividend windows for all stocks (±80 days)…
  Equinor: 24 events
  Vår Energi: 14 events
  Aker BP: 24 events
```

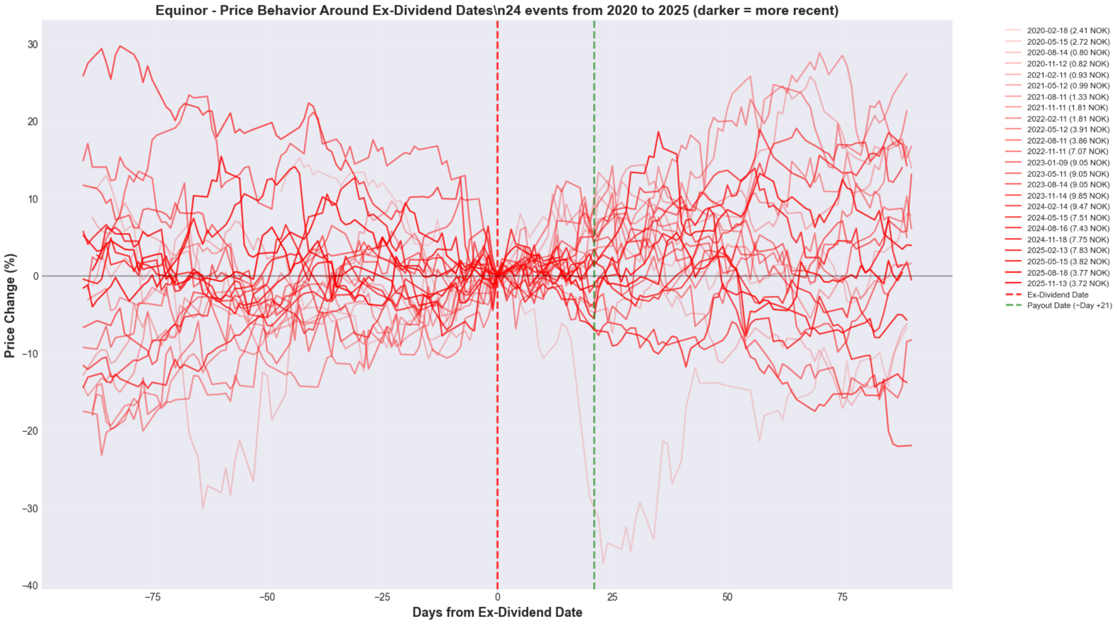
2.3.1 Price Behavior Around Ex-Dividend Dates (±80 days)

Each line represents one dividend event showing the full cycle between dividends. Colors indicate different years.

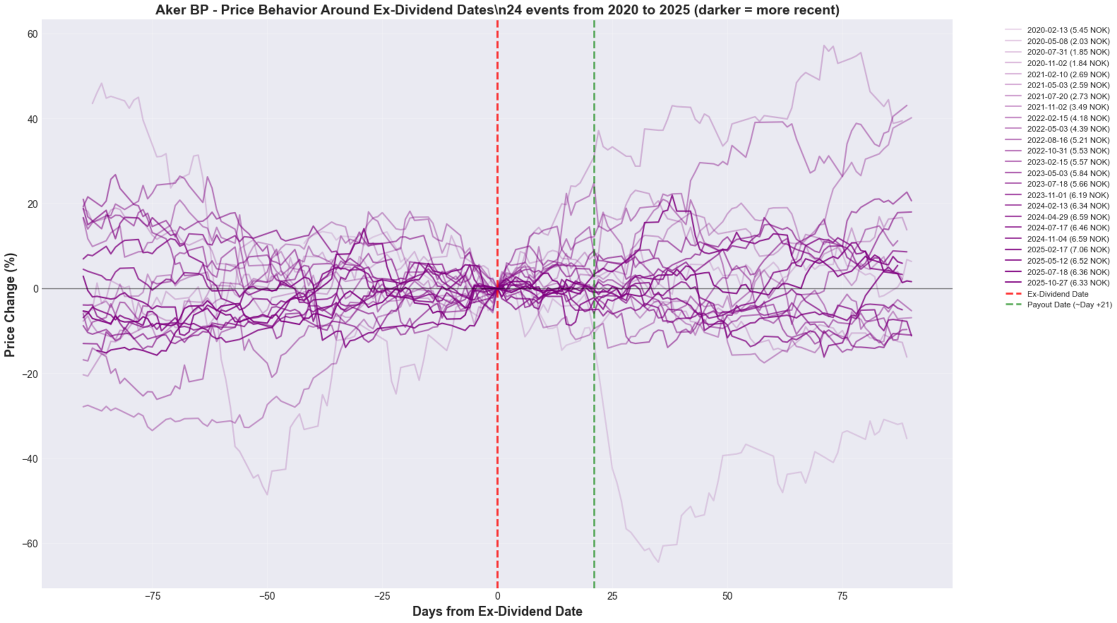
[11]:

```python
def plot_dividend_behavior(stock_name):
    """Plot all dividend events overlaid with transparency gradient (older = more transparent)"""
    windows = all_windows[stock_name]

    if len(windows) == 0:
        print(f"No dividend data for {stock_name}")
        return

    fig, ax = plt.subplots(figsize=(16, 9))

    # Get stock-specific color
    base_color = COLORS.get(stock_name, 'darkblue')

    # Sort windows by date (oldest first)
    windows_sorted = sorted(windows, key=lambda x: x['date'])

    # Get unique years for summary
    years = sorted(set([w['year'] for w in windows]))

    # Create alpha gradient: oldest = most transparent, newest = most opaque
    n_events = len(windows_sorted)
    alphas = np.linspace(0.15, 0.9, n_events)  # Range from 0.15 to 0.9

    # Plot each dividend event
    for i, window in enumerate(windows_sorted):
        date_str = window['date'].strftime('%Y-%m-%d')
        year = window['year']

        ax.plot(window['relative_days'],
                window['normalized_prices'],
                color=base_color,
                alpha=alphas[i],
                linewidth=1.5,
                label=f"{date_str} ({window['amount']:.2f} NOK)")

    # Add reference lines
    ax.axvline(x=0, color='red', linestyle='--', linewidth=2, alpha=0.8, label='Ex-Dividend Date')
    ax.axvline(x=21, color='green', linestyle='--', linewidth=2, alpha=0.6, label='Payout Date (~Day +21)')
    ax.axhline(y=0, color='black', linestyle='-', linewidth=1, alpha=0.5)
    # Styling
    ax.set_xlabel('Days from Ex-Dividend Date', fontsize=13, fontweight='bold')
    ax.set_ylabel('Price Change (%)', fontsize=13, fontweight='bold')
    ax.set_title(f'{stock_name} - Price Behavior Around Ex-Dividend Dates\\n' +
                 f'{len(windows)} events from {years[0]} to {years[-1]} (darker␣
↪= more recent)',
                 fontsize=14, fontweight='bold')
    ax.grid(True, alpha=0.3)

    # Legend with years color-coded
    handles, labels = ax.get_legend_handles_labels()
    # Remove duplicate "Ex-Dividend Date" label
    unique_labels = []
    unique_handles = []
    seen = set()
    for h, l in zip(handles, labels):
        if l not in seen:
            unique_handles.append(h)
            unique_labels.append(l)
            seen.add(l)

    ax.legend(unique_handles, unique_labels, bbox_to_anchor=(1.05, 1),␣
↪loc='upper left',
              fontsize=8, ncol=1)

    plt.tight_layout()
    plt.show()

    # Print summary
    print(f"\n{stock_name} Summary:")
    print(f"  Total events: {len(windows)}")
    print(f"  Years covered: {years[0]}-{years[-1]}")
    print(f"  Events per year: {', '.join([f'{y}: {sum(1 for w in windows if␣
↪w['year'] == y)}' for y in years])}")

# Plot for each stock
for stock_name in ['Equinor', 'Aker BP', 'Vår Energi']:
    print(f"\n{'='*80}")
    plot_dividend_behavior(stock_name)
```

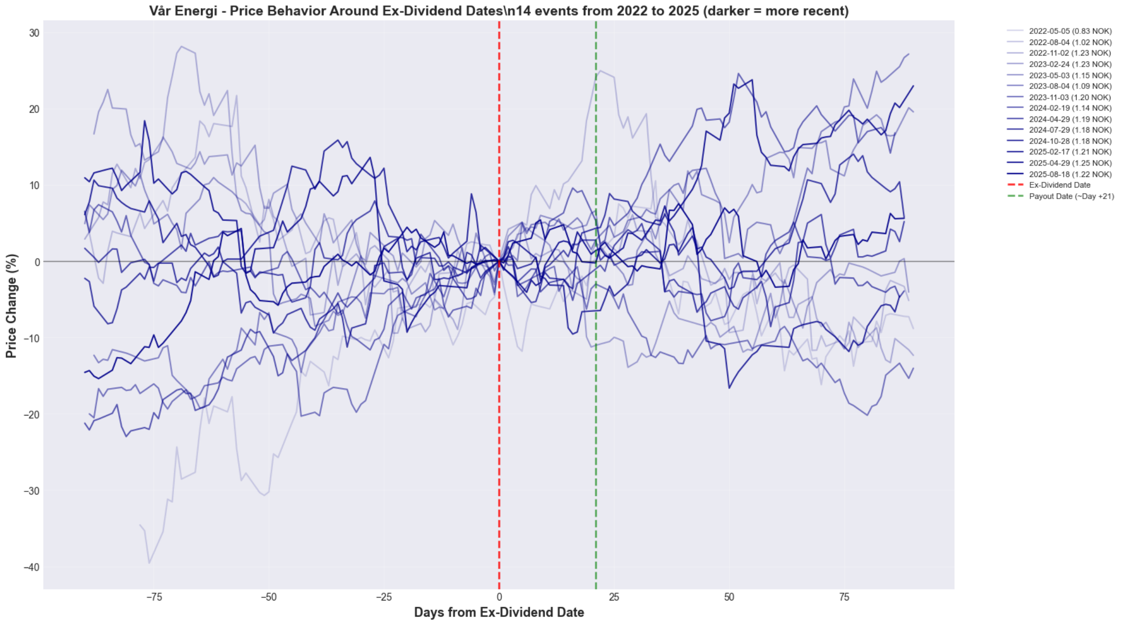
```
================================================================================
```



```
Equinor Summary:
  Total events: 24
  Years covered: 2020-2025
  Events per year: 2020: 4, 2021: 4, 2022: 4, 2023: 4, 2024: 4, 2025: 4

================================================================================
```



```
Aker BP Summary:
  Total events: 24
  Years covered: 2020-2025
  Events per year: 2020: 4, 2021: 4, 2022: 4, 2023: 4, 2024: 4, 2025: 4

================================================================================
```



```
Vår Energi Summary:
  Total events: 14
  Years covered: 2022-2025
  Events per year: 2022: 3, 2023: 4, 2024: 4, 2025: 3
```

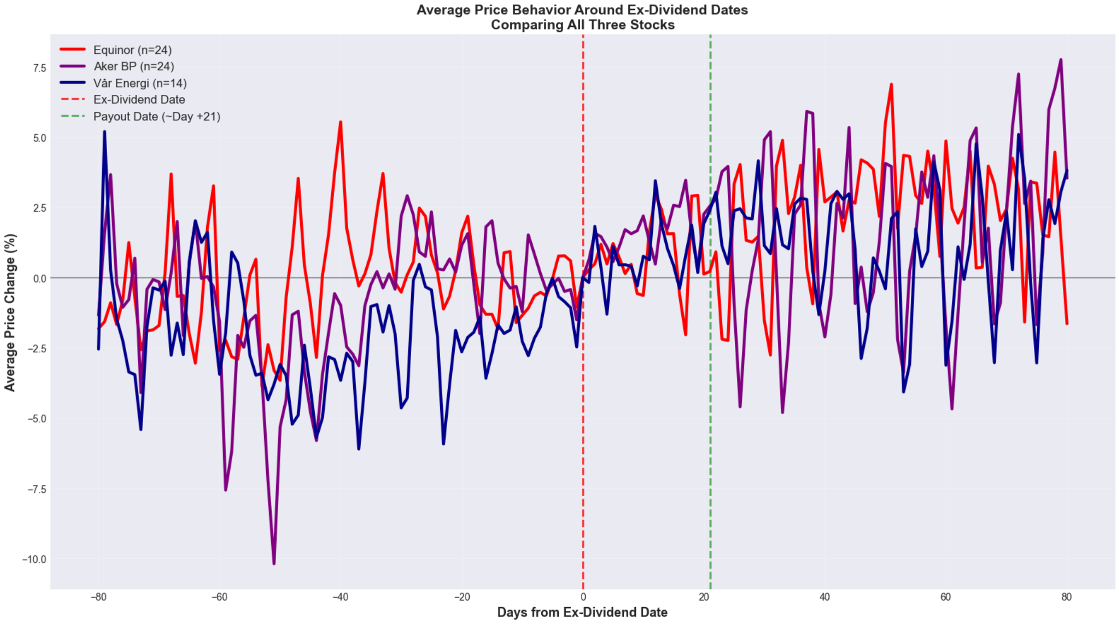
2.3.2 Average Behavior Pattern

Shows the average price movement across all dividend events for each stock

[12]:
```
# Calculate average behavior across all events
fig, ax = plt.subplots(figsize=(16, 9))

# Use consistent color scheme
colors_map = COLORS

# Use full target range for all stocks
target_days = list(range(-80, 81))
```

```
for stock_name in ['Equinor', 'Aker BP', 'Vår Energi']:
    windows = all_windows[stock_name]

    if len(windows) == 0:
        continue

    # Interpolate all windows to the full target range
    # For each day, collect all available values and average them
    daily_values = {day: [] for day in target_days}

    for window in windows:
        # For each day in this window, add its value to the corresponding␣
 ↪target day
        for rel_day, price in zip(window['relative_days'],␣
 ↪window['normalized_prices']):
            if rel_day in daily_values:
                daily_values[rel_day].append(price)

    # Calculate mean for each day (only where we have data)
    valid_days = []
    mean_prices = []

    for day in target_days:
        if len(daily_values[day]) > 0:
            valid_days.append(day)
            mean_prices.append(np.mean(daily_values[day]))

    # Plot mean line
    ax.plot(valid_days, mean_prices, color=colors_map[stock_name], linewidth=3,
            label=f'{stock_name} (n={len(windows)})', zorder=10)

    print(f"{stock_name}: plotting {len(valid_days)} days (from␣
 ↪{min(valid_days)} to {max(valid_days)})")

# Reference lines
ax.axvline(x=0, color='red', linestyle='--', linewidth=2, alpha=0.8,␣
 ↪label='Ex-Dividend Date')
ax.axvline(x=21, color='green', linestyle='--', linewidth=2, alpha=0.6,␣
 ↪label='Payout Date (~Day +21)')
ax.axhline(y=0, color='black', linestyle='-', linewidth=1, alpha=0.5)

# Styling
ax.set_xlabel('Days from Ex-Dividend Date', fontsize=13, fontweight='bold')
ax.set_ylabel('Average Price Change (%)', fontsize=13, fontweight='bold')
ax.set_title('Average Price Behavior Around Ex-Dividend Dates\nComparing All␣
 ↪Three Stocks',
             fontsize=14, fontweight='bold')
ax.grid(True, alpha=0.3)
ax.legend(fontsize=12, loc='best')

plt.tight_layout()
plt.show()

# Print key statistics
print(f"\n{'='*80}")
print("KEY PATTERNS OBSERVED:")
print(f"{'='*80}\n")

for stock_name in ['Equinor', 'Aker BP', 'Vår Energi']:
    windows = all_windows[stock_name]
    if len(windows) == 0:
        continue

    # Use same approach as plotting: collect values for each day
    daily_values = {day: [] for day in target_days}

    for window in windows:
        for rel_day, price in zip(window['relative_days'],␣
 ↪window['normalized_prices']):
            if rel_day in daily_values:
                daily_values[rel_day].append(price)

    # Calculate mean for each day
    valid_days = []
    mean_prices = []

    for day in target_days:
        if len(daily_values[day]) > 0:
            valid_days.append(day)
            mean_prices.append(np.mean(daily_values[day]))

    print(f"{stock_name}:")

    # Day 0 behavior
    if 0 in valid_days:
        day0_idx = valid_days.index(0)
        print(f"  Day 0 (Ex-Date):          {mean_prices[day0_idx]:+.2f}%")

    # Before ex-date
    pre_indices = [i for i, d in enumerate(valid_days) if -7 <= d <= -1]
    if pre_indices:
        pre_avg = np.mean([mean_prices[i] for i in pre_indices])
        print(f"  Week before (-7 to -1):   {pre_avg:+.2f}%")
    # After ex-date
    post_indices = [i for i, d in enumerate(valid_days) if 1 <= d <= 7]
    if post_indices:
        post_avg = np.mean([mean_prices[i] for i in post_indices])
        print(f"  Week after (+1 to +7):    {post_avg:+.2f}%")

    # Find best/worst days
    best_day_idx = np.argmax(mean_prices)
    worst_day_idx = np.argmin(mean_prices)

    print(f"  Best entry (lowest):      Day {valid_days[worst_day_idx]:+d}␣
↪({mean_prices[worst_day_idx]:+.2f}%)")
    print(f"  Peak price (highest):     Day {valid_days[best_day_idx]:+d}␣
↪({mean_prices[best_day_idx]:+.2f}%)")
    print()
```

```
Equinor: plotting 161 days (from -80 to 80)
Aker BP: plotting 161 days (from -80 to 80)
Vår Energi: plotting 161 days (from -80 to 80)
```



```
================================================================================
KEY PATTERNS OBSERVED:
================================================================================

Equinor:
  Day 0 (Ex-Date):          +0.00%
  Week before (-7 to -1):   -0.02%
  Week after (+1 to +7):    +0.65%
  Best entry (lowest):      Day -53 (-3.86%)
  Peak price (highest):     Day +51 (+6.89%)

Aker BP:
  Day 0 (Ex-Date):          +0.00%
  Week before (-7 to -1):   -0.43%
  Week after (+1 to +7):    +1.16%
  Best entry (lowest):      Day -51 (-10.19%)
  Peak price (highest):     Day +79 (+7.76%)

Vår Energi:
  Day 0 (Ex-Date):          +0.00%
  Week before (-7 to -1):   -1.06%
  Week after (+1 to +7):    +0.39%
  Best entry (lowest):      Day -37 (-6.10%)
  Peak price (highest):     Day -79 (+5.20%)
```