In [9]:
```
import pandas as pd
from apyori import apriori
import matplotlib.pyplot as plt
import seaborn as sns
```

In [10]:
```
df = pd.read_csv("Market_Basket_Optimisation.csv", header=None)
df.head()
```

Out[10]:

	0	1	2	3	4	5	6	7	8	
0	shrimp	almonds	avocado	vegetables mix	green grapes	whole weat flour	yams	cottage cheese	energy drink	tom j
1	burgers	meatballs	eggs	NaN	NaN	NaN	NaN	NaN	NaN	N
2	chutney	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	N
3	turkey	avocado	NaN	NaN	NaN	NaN	NaN	NaN	NaN	N
4	mineral water	milk	energy bar	whole wheat rice	green tea	NaN	NaN	NaN	NaN	N

In [15]:
```
transactions = []
for i in range(0, df.shape[0]):
    transaction = [str(df.values[i, j]) for j in range(0, 20) if str(df.v
    transactions.append(transaction)
print("Sample transaction: ", transaction[0])
print("Total transactions: ", len(transactions))
```

```
Sample transaction:  eggs
Total transactions:  7501
```

In [16]:
```
rules = apriori(transactions, min_support=0.003, min_confidence=0.2, min_
results = list(rules)
print("Total rules generated: ", len(results))
```

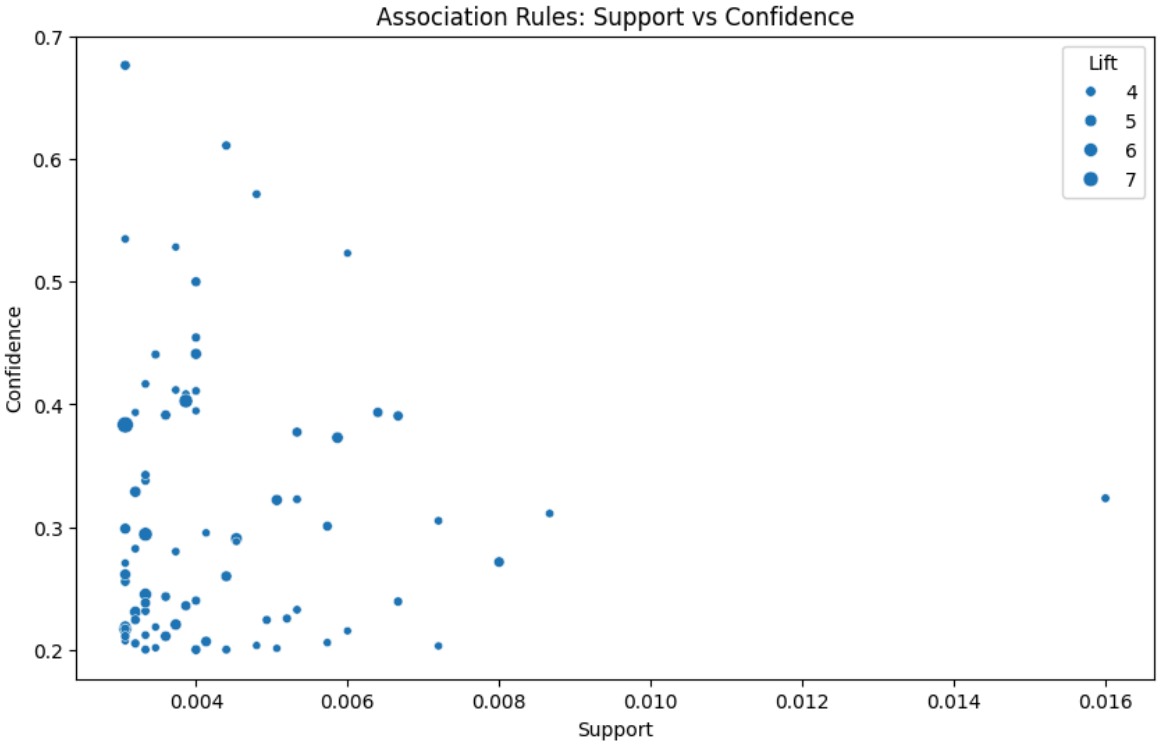
```
Total rules generated:  80
```

In [19]:
```
def inspect(results):
    lhs = [tuple(result[2][0][0])[0] for result in results]
    rhs = [tuple(result[2][0][1])[0] for result in results]
    support = [result[1] for result in results]
    confidence = [result[2][0][2] for result in results]
    lifts = [result[2][0][3] for result in results]
    return list(zip(lhs, rhs, support, confidence, lifts))

rules_df = pd.DataFrame(inspect(results), columns=['Left Hand Side', 'Rig
rules_df.head()
```

Out[19]:

	Left Hand Side	Right Hand Side	Support	Confidence	Lift
0	light cream	chicken	0.004533	0.290598	4.843951
1	mushroom cream sauce	escalope	0.005733	0.300699	3.790833
2	pasta	escalope	0.005866	0.372881	4.700812
3	fromage blanc	honey	0.003333	0.245098	5.164271
4	herb & pepper	ground beef	0.015998	0.323450	3.291994

In [20]:
```
plt.figure(figsize=(10,6))
sns.scatterplot(x='Support', y='Confidence', size='Lift', data=rules_df)
plt.title("Association Rules: Support vs Confidence")
plt.xlabel("Support")
plt.ylabel("Confidence")
plt.show()
```



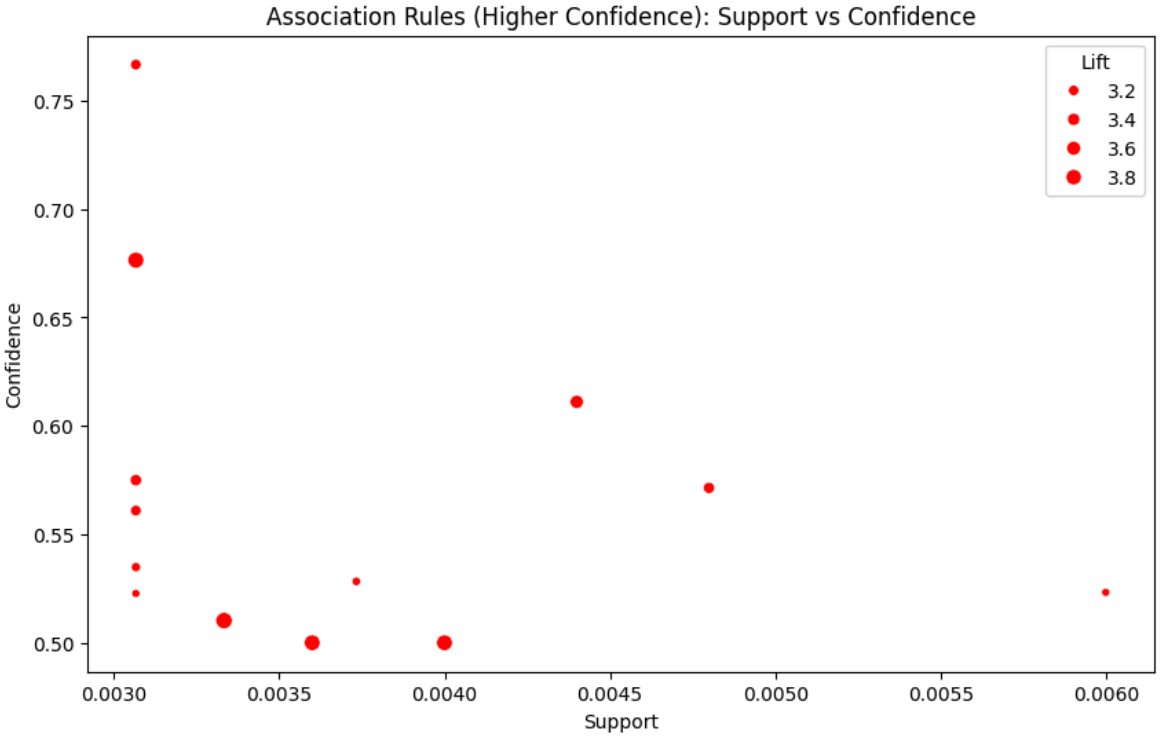
In [22]:
```
rules_high_conf = apriori(transactions,
                          min_support=0.003,
                          min_confidence=0.5, # Increased from 0.2 → 0.5
                          min_lift=3,
                          min_length=2)

results_high_conf = list(rules_high_conf)
rules_high_conf_df = pd.DataFrame(inspect(results_high_conf),
                                  columns=['Left Hand Side', 'Right Hand

print("Rules generated after increasing confidence:", len(rules_high_conf
rules_high_conf_df.head()
```

```
Rules generated after increasing confidence: 14
```

Out[22]:

	Left Hand Side	Right Hand Side	Support	Confidence	Lift
0	cereals	spaghetti	0.003066	0.676471	3.885303
1	chicken	milk	0.003600	0.500000	3.858539
2	cooking oil	spaghetti	0.004799	0.571429	3.281995
3	red wine	spaghetti	0.003733	0.528302	3.034297
4	soup	milk	0.003999	0.500000	3.858539

In [23]:
```
plt.figure(figsize=(10,6))
sns.scatterplot(x='Support', y='Confidence', size='Lift', data=rules_high
plt.title("Association Rules (Higher Confidence): Support vs Confidence")
plt.xlabel("Support")
plt.ylabel("Confidence")
plt.show()
```



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